40-43 C

PSYCHE

A JOURNAL OF ENTOMOLOGY

ESTABLISHED IN 1874

VOL. XL-43 MARCH, 1933-36 No. 1

CAMBRIDGE ENTOMOLOGICAL CLUB
1874

TABLE OF CONTENTS

New Psammocharidæ from the United States. *Nathan Banks* 1

Mermis Parasitism in some Australian and Mexican Ants. *Wm. M. Wheeler* 20

Trichoptera from the Mountains of North Carolina and Tennessee. *F. M. Carpenter* 32

Notes on American Trypetidæ (Diptera) II. *Marston Bates*.... 48

CAMBRIDGE ENTOMOLOGICAL CLUB

OFFICERS FOR 1932

President	C. W. Collins
Vice-President	P. J. Darlington
Secretary	J. W. Johnston
Treasurer	F. H. Walker
Executive Committee	J. Bequaert F. M. Carpenter S. M. Dohanian

EDITORIAL BOARD OF PSYCHE

EDITOR-IN-CHIEF

C. T. Brues, Harvard University

ASSOCIATE EDITOR

F. M. Carpenter

CONSULTING EDITORS

Nathan Banks,
Harvard University.

A. L. Melander,
College of the
City of New York.

Thomas Barbour,
Harvard University.

A. P. Morse,
Peabody Museum,
Salem, Mass.

A. E. Emerson,
University of Chicago.

J. G. Needham,
Cornell University.

W. M. Wheeler,
Harvard University.

PSYCHE is published quarterly, the issues appearing in March, June, September, and December. Subscription price, per year, payable in advance: $2.00 to Subscribers in the United States; foreign postage, 25 cents extra, Canada 15 cents. Single copies, 65 cents.

Cheques and remittances should be addressed to Treasurer, Cambridge Entomological Club, Museum of Comparative Zoology, Cambridge, Mass.

Orders for back volumes, missing numbers, notices of change of address, etc., should be sent to F. M. Carpenter, Museum of Comparative Zoology, Cambridge, Mass.

IMPORTANT NOTICE TO CONTRIBUTORS

Manuscripts intended for publication, books intended for review, and other editorial mattter, should be addressed to Professor C. T. Brues, Institute of Biology, Harvard University, Cambridge, Mass.

Authors contributing articles over 8 printed pages in length will be required to bear a part of the extra expense, for additional pages. This expense will be that of typesetting only, which is about $2.00 per page. The actual cost of preparing cuts for all illustrations must be borne by contributors; the expense for full page plates from line drawings is approximately $5.00 each, and for full page half-tones, $7.50 each; smaller sizes in proportion.

AUTHOR'S SEPARATES

Reprints of articles may be secured by authors, if they are ordered before, or at the time proofs are received for corrections. The cost of these will be furnished by the Editor on application.

Entered as second-class mail matter at the Post Office at Boston, Mass. Acceptance for mailing at special rate of postage provided in Section 1103, Act of October 3, 1917, authorized on June 29, 1918.

Printed by the Eliot Press, Jamaica Plain, Mass., U.S.A.

PSYCHE

VOL. XL MARCH, 1933 No. 1

NEW PSAMMOCHARIDÆ FROM THE UNITED STATES

By Nathan Banks

Museum of Comparative Zoölogy.

The following new species are largely from the collections made by Dr. Bequaert and recently given by him to the Museum of Comparative Zoölogy.

Planiceps yavapai sp. nov.

♀ Black, scarcely at all purplish, wings black, on each side of second segment of abdomen is a distinct white spot.

Head and general structure similar to *P. luxus*, the front femora even more swollen than in *P. luxus;* the hairs on front coxae are very fine and short, much shorter than in *P. assimilis*, the rest of legs devoid of hairs. There are short erect hairs on face, and still shorter ones on pronotum; propodeum and pleura without hairs. The face is fully as narrow as in *P. luxus* (much more narrow than *P. niger*). The posterior ocelli are scarcely nearer to eyes than to each other; the antennae are noticeably more slender and longer than in other species, the third joint being more than three times as long as broad; inner spur of hind tibia about two-fifths of basitarsus. Venation similar to the mentioned species; the second submarginal rather long, receiving the

M4714
25
15 Nov

first recurrent vein just beyond the middle, the second recurrent ends just a little beyond the cell; the second discoidal cell is quite long, once and a half as long as second recurrent vein, latter very oblique.

Length 14 mm., fore wing 10 mm.

From Post Creek Canon, Pinaleno Mts., Arizona, 15-18 July (J. Bequaert). Type M.C.Z. 17028.

Pedinaspis nigriceps sp. nov.

♀ Head black, scutellum, propodeum, pleura, legs, antennae, basal abdominal segment, and tip of abdomen, black. Pronotum, mesonotum (except scutellum) abdominal segments from second to fifth inclusive, red. Clypeus strongly rounded below; third joint of antennae no longer than fourth; ocelli up as high as in *P. mariae,* in a low triangle, posteriors scarcely nearer to eyes than to each other. Pronotum slightly arcuate behind; propodeum with a broad deep median groove on the basal part, the declivity transversely striate. Wings fumose, about as in *P. contiguus;* venation like that of *P. mariae;* inner spur of hind tibia scarcely two-fifths of basitarsus, shorter than *P. mariae,* legs spined similar to *mariae.*

Length 19 mm., fore wing 12 mm.

From Stein, Grant Co., New Mexico, 14 July (J. Bequaert). Type M.C.Z. 17029.

Separated from *P. contiguus* by black propodeum, and by fifth abdominal segment red, no white on tip, and striæ on propodeum. It is near to *P. portici* Rohwer in appearance, but that has a red head and is described in the subgenus *Psorthaspis;* this is a true *Pedinaspis.*

Allaporus gen. nov.

Type *Planiceps pulchellus* Bks., also going in the genus is *P. hesperus* Bks.

They differ from our other *Planiceps* in having the first recurrent vein interstitial with the base of the second submarginal cell, and the second recurrent vein ends in the second submarginal cell a short distance before tip. This second submarginal cell is fully as high as long. Both species are very small.

It differs from *Teleostegus* (of Europe) which has both recurrents ending in second submarginal, in having this cell very short, the first recurrent interstitial with the base of second submarginal, and in that the basal vein ends plainly before the transverse cubital.

Aporinellus bequaerti sp. nov.

♀ Black, basal joint of antennæ, the mandibles, all coxæ, femora and tibiæ ferrugineous. Head, pronotum (except black before tip), most of propodeum, the pleura, apical bands on first four segments of abdomen sericeous, the first segment also sericeous in middle above, not on sides, tarsi yellow brown; wings slightly fumose, much darker toward tip.

Clypeus very broad, truncate in front; third joint of antennæ scarcely if any longer than first, a faint median line from anterior ocelli down to antennæ; face about as broad as in *ferrugineipes;* ocelli a little closer to eyes than to each other; front basitarsus with but two comb-spines; mid and hind tibia with a few spines above, inner spur of hind tibia about one-half of basitarsus; in fore wing the second submarginal cell is no longer than the marginal.

Length 5.5 mm., fore wing 4.5 mm.

From El Paso, Texas, 11 July (J. Bequaert). Type M.C.Z. 17030.

Separated from *A. ferrugineipes* not only by the front and mid legs and basal joint of antennæ yellowish, but by the sericeous basal abdominal segment; in *ferrugineipes* it is across both base and tip.

Aporinellus basalis sp. nov.

♀ Deep black, face, clypeus and basal joint of antennae densely sericeous, vertex bare, front half of pronotum sericeous and a narrow white band on mesonotum connecting the bases of the wings; the metanotum outside of the scutellem sericeous, propodeum sericeous, pleura sericeous, but usually part of sides black; legs (except tarsi) also sericeous; abdomen with rather narrow sericeous bands on apex of first, second, third, and fourth segments, the first segment also shows a median area sericeous, but the sides are deep black; venter with three narrow sericeous bands. Head very narrow, face (including clypeus) much more narrow than in *A. fasciatus;* no evident median line on face; posterior ocelli closer to eyes than to each other, ocellar triangle not as low as in *A. fasciatus;* antennæ, spines on legs, and venation as in *A. fasciatus;* three of the four females have three submarginal cells, the other lacks (as usual) the dividing nervure, when present the third is much smaller than the second, and narrowed above.

Length 6 mm., fore wings 5.5 mm.

From Tempe, Arizona, 2 August (J. Bequaert). Type M.C.Z. 17031.

Readily separated from others by the narrow face.

Male taken at same time is very similar, more slender, the propodeum is sericeous all over, four segments banded at tip, and much resembles *A. apicatus,* but lacks the white spot at tip of abdomen, and has a narrower face.

Episyron laevis sp. nov.

♀ Black, no yellow on orbits nor on abdomen. Resembles *biguttatus,* but with much less and shorter hair, and with the third joint of antennae not nearly as long as in *E. biguttatus,* not nearly equal to width of vertex; there are three comb-spines on front basitarsus as in *biguttatus,* but all are longer, the apical one reaching much beyond the tip of the second tarsal joint, and more than one-half the length of the basitarsus, other comb-spines also extra long. The hair on head is short, as also that on pronotum, the pleura are not hairy, except very minute ones; the propodeum with a few erect hairs, and a few on basal abdominal segment above; venter with hairs only toward tip; the femora show no hair below; long spur of hind tibia two thirds of basitarsus. Wings and venation similar to *biguttatus.*

Length 7.5 mm., fore wing 7 mm.

From Fedor, Lee Co., Texas, 27 March (G. Birkmann). Type M.C.Z. 17032.

Episyron arizonica sp. nov.

♀ Bluish black throughout, no pale on orbits nor on abdomen; wings nearly uniform black, only little darker towards tips. Head and thorax and basal abdominal segment hairy as in *E. biguttatus*. The femora with very fine short hairs beneath as in *biguttatus* (not long as in *californica*). Front tarsi with three comb-spines on front basitarsus, but all, as well as others, longer than in *biguttatus*, the one at tip extending over tip of second tarsal joint, otherwise legs spined as in *biguttatus*; third joint of antennae long as in *biguttatus*, no median line on lower face as shows in *biguttatus*. Abdomen more slender than in *biguttatus*, scarcely any hairs on basal part of venter, many near tip; venation as in *biguttatus*.

Length 11 mm., fore wing 10 mm.

From Apache Camp, Santa Catalina Mts., Arizona, 25 July, 5,500 ft. (J. Bequaert). Type M.C.Z. 17033.

Sericopompilus fumosus sp. nov.

♂ Body and antennae black, the hind border of the pronotum with a yellowish band; fore wings black except the base; hind wings fumose, base clearer; legs black, hind tarsi with the upper half of the second, third, and fourth joints and on mid tarsi, the upper half of first, second, third, and fourth joints white, hind tibia with a white streak on basal half above.

Body very slender as in *S. cinctipes*, and the structure generally similar. Clypeus rounded below; ocelli in a low triangle, the posteriors a little nearer to eyes than to each other; hind border of pronotum broadly arcuate; propodeum scarcely arched, with a silvery sheen in certain lights; abdomen black, beneath with a few fine hairs, most numerous near the tip; long spur of the hind tibia two-thirds of basitarsus. Wings with venation very similar to *S. cinctipes*, but the third submarginal cell is less narrowed above, and the second recurrent ends at middle of third submarginal.

Length 7 to 8 mm., fore wing 7 to 8 mm.

Type M.C.Z. 17050. From Colorado Springs, Colo., 12 to 19 July (Klots), and Hot Springs, So. Dak., 9 to 19 July (Severin).

Sophropompilus mohave sp. nov.

♀ Differs from *bradleyi* and *tumiformis* in less hairy head and body. From *subangulatus* in shape of pronotum and in shorter propodeum, from *parvus* in having ocelli about as near eyes as to each other.

Deep bluish black, antennae and tarsi dull black, fore-wings violaceous black, hind wings hyaline, tips clouded; clypeus and lower part of face silvery. Clypeus broad, truncate in front; face with very short hairs; vertex nearly straight across, with some long hairs; ocelli subequal, in low triangle, posteriors about as near to eyes as to each other; occiput strongly silvery; antennae short as usual, third joint not longer than fourth; pronotum arcuate behind, with few extremely short hairs above; propodeum fully as short as in *parvus*, with few, short erect hairs above; pleura without hair; abdomen with only a very few short hairs near tip above, below more hairy, but also short. Legs smooth on femora and tibiæ, front coxæ with a few long hairs in front, mid and hind tibiæ with short scattered spines; inner spur of hind tibia a little more than one-half of basitarsus; front tarsus with three long comb spines on basitarsus. Venation very similar to eastern *S. hyacinthinus*, but the marginal cell longer, in this respect like the western *S. tumifrons*.

Length 9 mm., fore wing 6.5 mm.

From Tempe, Arizona, 1 August, and southern Arizona (J. Bequaert). Type M.C.Z. 17034.

Psammochares fabricii, nom. nov.

Dr. J. Bequaert has shown that the *Sphex tropica* of Fabricius (which is a Psammocharid) is not the same as the older *Sphex tropica* of Linnæus (which is a *Vespa*). It is therefore necessary to rename the species which Cresson (Trans. Amer. Ent. Soc. I, 98, 1867) treated as *Pompilus tropicus*; I presume, but do not know, that the species called *Sphex tropica* by Fabricius is the same.

Psammochares catalinæ sp. nov.

♀ Black throughout, head and thorax, pleura, propodeum with front coxæ hairy; not quite as much so as in *P. scelestus,* the femora not hairy, or with a few fine hairs, the mid and hind femora on apical part with distinct short spines rising from pits (these not in *scelestus.*) Face narrower than in *P. scelestus*, plainly narrowed above; the ocelli in a more nearly equilateral triangle, the posteriors only a little nearer to each other than to eyes; third joint of antennæ one and a third as long as the fourth; pronotum strongly angulate behind as in *P. scelestus;* propodeum sloping as in *P. scelestus*, not quite as much arched, a distinct median line on basal part; abdomen with a few hairs on base of first segment, and on tip and along venter. Legs of moderate length, with only a few extremely fine short hairs; front basitarsus with but three comb-spines, no shorter spine before them; inner spur of the hind tibia a little more than one-half of basitarsus. Wings with venation about same as in *P. scelestus,* second and third submarginal usually a little shorter in proportion and subequal in length. The male is very similar, but much more slender; the ventral plate has a very prominent median carina on the basal part, no hair-tufts; tip of abdomen is somewhat silvery in certain lights.

Length 9-10 mm., fore wing 8 mm., male 8 mm.

From Mt. Lemon, Santa Catalina Mts., Ariz., 6000 to 9150 ft. (mostly at 7800 ft.), 27 to 29 July (J. Bequaert).

Readily separated from *P. scelestus* by the narrower face, only three comb-spines on front basitarsus, less hairy body, and by the minute spines above on mid and hind femora. Type M.C.Z. 17039.

Cryptocheilus arizonicus sp. nov.

♀ Body, antennæ, and legs black; wings yellowish, tips black. Clypeus broad, broadly concave in front, more so than in *C. terminatus;* vertex rounded; ocelli subequal, in a low triangle, posteriors almost twice as close to each other as to eyes; antennæ not very long, slender, third joint long, one-half longer than the fourth; occiput without long hair;

pronotum moderately long, angulate behind, not hairy; pleura and propodeum also without hair, propodeum rather short, at first nearly horizontal, then suddenly bending down, basal part smooth, but apical part very plainly finely striate, the striæ strongest near tip. Abdomen with a few hairs near tip and on apical half of the venter. Legs of moderate length, spined about as in *C. terminatus*, inner spur of hind tibia short as in that species, some long hairs on front of front coxæ. Wings also similar to *C. terminatus*, the marginal cell a little more pointed at tip, first recurrent ends beyond middle of second submarginal, second recurrent at middle of third submarginal.

A male is similar, with very long, slender antennæ, the clypeus not excavate in front, the propodeum distinctly finely striate, and more toward base than in the female. The ventral plate is broad, with a median carina which on the basal part widens to a triangular area, not margined by carinæ, very similar to the plate of *C. birkmanni*.

Length ♀ 13 mm., fore wing 10 mm.; ♂ 10 mm.

From Tempe, Arizona, 1 August (J. Bequaert).

Readily separated from *C. terminatus* by the striate posterior part of propodeum. Type M.C.Z. 17035.

Cryptocheilus attenuatus sp. nov.

♂ Body and legs black, clothed with fine appressed pubescence, antennæ beyond the second joint yellow, wings yellowish, tips broadly black. Face rather narrow, clypeus broad, truncate in front, vertex rounded from eye to eye, ocelli subequal, posteriors much nearer to each other than to eyes, vertex with a few erect hairs, thorax without long hairs; pronotum rather long, arcuate behind; propodeum rather long, evenly arched, sides parallel; abdomen elongate, slender, hairs only on the last segment, pygidium margined on each side by a row of curved upturned hairs, and a median row of smaller hairs; ventral plate much longer than broad, tapering toward tip, with a faint median carina. Wings rather slender, marginal cell broadly rounded at tip, where it scarcely surpasses end of the third submarginal, being much more than its length from the tip of wing;

second submarginal a little longer than high, third but little longer than second, but wider, upper side fully two thirds of lower; first recurrent ends at middle of second submarginal, second recurrent, which is evenly curved, ends beyond the middle of the third submarginal.

Legs not very long, but tarsi long; front tibia with only a trace of spines beneath, front basitarsus not spined above, mid tibia with two rows of a few weak spines, or bristles above, hind tibia with two rows of about eight short bristles above, inner spur of hind tibia scarcely two fifths of basitarsus, last joint of hind tarsus with only two or three small spines beneath.

Length 9 mm., fore wing 5.5 mm.

From New Braunfels, Texas, 27 June (J. Bequaert). Type M.C.Z. 17036.

The last joint of hind tarsus would almost place this in *Priocnemis*, but the shape of the marginal cell and the palpi is that common in *Cryptocheilus*. Its slender body separates it from all other species that I have seen.

Onochares gen. nov.

In general similar to *Cryptocheilus;* last joints af all tarsi with spines beneath; claws with tooth near middle; marginal cell pointed at tip; entire body, coxæ, femora, and tibia with long hair; even on the abdomen above; the hind tibia beneath with long hairs (no spines), above the hind tibia is densely hairy, there is an inner row of teeth without spines, and among the hairs an outer row of very short spines, hind basitarsus without spines.

Separated from *Cryptocheilus* by the armature of hind tibia, the more pointed marginal cell, and hairy body and legs.

Includes *C. rugosus* Bks. Type *O. brazoria* n. sp.

Onochares brazoria sp. nov.

♀ Body, legs, and antennæ black; the tips of several joints of the antennæ narrowly reddish; wings ferruginous, extreme tips black. Body and legs hairy all over, those on head, pronotum, and upper side of abdomen rather short.

Clypeus broad, slightly concave on margin below; a line above base of the antennæ about one-half way up; ocelli large, posteriors very much nearer each other than to eyes; third joint of antennæ scarcely longer than the fourth, second and third about one-half of vertex-width; pronotum arcuate behind; propodeum short, high, rounded, steeply sloping behind, on basal part a median line very faint, no transverse wrinkles. Abdomen rather long, flattened above, last segment very densely hairy, basal parts of ventral segments without hair, surface punctulate; pleura very hairy, above the mid coxæ the mesopleura projects almost cone-like; legs rather short, front tibia with short spines below almost to base, mid and hind tibiæ without spines beneath, only long hairs, above armed as mentioned in generic description, the teeth about ten in number on hind tibia; long spur of hind tibia slightly incurved at tip, not one-third of the basitarsus. Wings similar to most *Cryptocheilus;* in hind wing the anal is nearly interstitial with the cubital fork; in fore wing the basal is much before the transverse; the marginal cell long, but with a pointed tip; second submarginal about one-half longer than high, third much longer below, scarcely longer above than second; first recurrent ends near middle of the second submarginal cell, second recurrent ends much before the middle of the third submarginal, this vein is only a trifle bowed outward.

Length 18 to 20 mm., fore wing 15 mm.

From Fedor, Lee Co., Texas (Birkman).

Type M.C.Z. 17037.

Priocnemis alienatus borealis var. nov.

Structurally similar to *P. alienatus;* differs in having the hind, as well as other, legs black, and in having but the first two segments of abdomen reddish. It represents a northern form with less red than usual, in contrast to Texas and Mexico specimens (*P. rupex* Cress.) which have the abdomen entirely red.

Specimens from Mt. Whiteface, N. Y., 22-24 August; Stony Brook Reservation, Mass., 21 June; and Alton, N. H., 11 August (Banks). Type M.C.Z. 17038.

Priocnemis oregona n. nov.

Priocnemis comparatus Walker was described in *Pompilus;* there was a previous *Pompilus comparatus* by Smith in 1855, therefore a new name is necessary for our species.

Priocnemis apache sp. nov.

♀ Body, legs, and antennæ ferrugineous throughout, tips of antennæ and last joints of legs a little more brown. Fore wings yellowish hyaline and with three brown bands, one over basal nervure, one behind the stigma, and one at apex; hind wings yellowish hyaline, with a broad dark band over tip. Clypeus large, truncate in front, with mostly golden appressed hair; vertex with some long erect hairs; ocelli equal, posteriors nearer to each other than to eyes, vertex straight across eye to eye; antennæ long and slender, third joint one-fourth longer than fourth, latter not longer than next; occiput, pronotum, and front coxæ with long yellowish hair, also rather long hair on scutellum and propodeum, latter with appressed yellowish pubescence behind, especially on sides; pronotum angulate behind. Abdomen moderately flattened and rather broad in middle, with yellowish hairs towards apex and on venter. Pleura with fine long, yellowish hair. Legs almost devoid of hairs, front tibia with a few minute spines, mid tibia with two rows of spines above, hind tibia with two rows of about twelve teeth above, last joint of hind tarsi without spines beneath, inner spur of hind tibia not quite one-half of basitarsus. Fore wings with marginal cell not its length from tip, second submarginal longer than high, both ends oblique, third submarginal one-half longer and wider behind, upper side one-third shorter than lower, first recurrent ends beyond middle of second submarginal, second recurrent ends a little before middle of the third submarginal cell. Veins yellowish, except in dark areas where they are brown.

Length 18 mm., fore wing 15 mm.

From Apache Canon, Santa Catalina Mts., 5500 ft., 25 July (J. Bequaert) and southern Arizona. Structurally similar to *P. nuperus,* and like that belonging to the subgenus *Priocnessus.* Type M.C.Z. 17040.

Priocnemis kiowa sp. nov.

♀ Body dull black, or very dark brown; femora and tibiæ the same, tarsi more brown, first and second joints of antennæ brown, beyond yellow, last two joints more brown. Wings black, tips scarcely paler. Clypeus large, front margin truncate, with appressed yellowish hair, and longer more erect bristles; ocelli equal, posteriors much closer to each other than to eyes; vertex straight across, with some erect black hairs; antennæ moderately long, third joint about one-third longer than the fourth, which is scarcely longer than each of the four following. Occiput, front coxæ and prosternum with much long black hair; pronotum with short black hair above, angulate behind, scutellum and propodeum with long black hair, as also on the pleura. Abdomen somewhat depressed, about as broad as *P. nuperus,* with much black or brown hair toward tip and on venter. Legs scarcely hairy, a few minute spines on front tibia, mid tibia with two rows of yellowish spines above, hind tibia with two rows of about 10 teeth above, inner spur of hind tibia almost one-half of the basitarsus, last joint of hind tarsus without spines beneath. Marginal cell of fore wings of the same shape as in *P. nuperus* and *apache,* the second submarginal longer than high, the third submarginal one-half longer and wider behind than the second, upper side about one-half of lower, first recurrent ends beyond middle of the second submarginal, second recurrent ends at middle of the third submarginal.

Length 15 mm., fore wing 13 mm.

From Walthena, Kansas, 23 July (W. M. Mann).

Like *P. apache,* it belongs in the subgenus *Priocnessus,* and like that species is structurally close to *P. nuperus.*

Type M.C.Z. 17041.

Priocnemis reynoldsi sp. nov.

♀ Head, thorax, legs, and antennæ dull black, abdomen yellowish above and below, wings pale yellowish hyaline, tips infuscated, veins yellowish. Clypeus very broad and low, in front faintly rounded, with appressed gray hair, and some longer yellowish ones; vertex plainly rounded from eye to eye; anterior ocellus rather larger than the posteriors, latter plainly a little nearer to each other than to the eyes; all front of head and vertex with appressed pale hair, no longer hairs; occiput and base of front coxæ with a few long hairs; antennæ very slender, third joint only about one-fourth longer than the fourth, which is no longer than any of the four following. Pronotum rather long, arcuate behind, clothed with appressed hair, as likewise the rest of the notum and the propodeum, latter rather low and evenly rounded, pleura without hair. Legs very long and slender especially the tarsi, coxæ and femora with only fine pubescence, front tibia with a few minute bristles beneath, front basitarsus with a few minute spines above, mid tibia with two or more rows of bristles above, hind tibia with two rows of about ten low teeth, each tipped with a minute bristle or spine, inner spur of hind tibia scarcely two-fifths of the basitarsus, hind tarsi especially long, claws with a minute tooth toward base. Abdomen convex, not very broad in middle, with appressed fine pubescence, only a few pale hairs near tip, none on venter except near tip.

Fore wings with marginal cell rather long, its outer side scarcely curved, and the end is out almost as far as the end of the third submarginal cell; second submarginal much longer than high, base more oblique than tip, third submarginal but little longer than the second, but wider behind, upper side about two-thirds of the lower; first recurrent ends at middle of the second submarginal, second recurrent a little before middle of the third submarginal, basal a little disjointed from transverse.

Length 14 mm., fore wing 10 mm.

From Ft. Reynolds, Colo. (Mills coll., Peabody Acad.). Type M.C.Z. 17042.

By the rounded vertex, long legs, and appressed hair, and venation it is similar to *P. incitus;* that species has a black abdomen.

Priocnemis pretiosa sp. nov.

♂ Black, tarsi more brown, wings yellowish on basal two-thirds, beyond infuscated. Body with minute appressed pubescence, practically no long hairs, two or three each side on vertex, and a few at tip of the abdomen. Face rather broad, vertex arcuate from eye to eye, clypeus moderately broad, slightly rounded below, eye extending a little below corner of clypeus; antennae situate close to clypeal margin, moderately long and slender, third joint hardly as long as first and second combined, and barely if any longer than the fourth; anterior ocellus larger than the posteriors, latter plainly nearer each other than to the eyes; pronotum moderately long, angulate behind; propodeum low, finely punctate, a faint median line; abdomen rather slender, almost polished, ventral plate a little longer than broad, slightly produced in middle behind, surface hairy, with some stout bristles on margin, a row of longer ones across tip; legs moderately long, front tibia without bristles, none above on front basitarsus, mid tibia with two rows of minute bristles above, hind tibia with scarcely more distinct bristles above, about eight in each row, inner spur of the hind tibia more than one-half of the basitarsus. Wings rather slender, out to the stigma yellow, and with yellow veins, a brown cloud in the basal half of marginal cell, in most of second submarginal, and most of second discoidal cells; a similar, broad, brown cloud over the apex; hind wings yellow on basal part, tip infuscated; in forewing the marginal is pointed at tip which is less than length of marginal from tip of wing, and beyond the end of third submarginal; second submarginal scarcely longer than high, third submarginal a little longer, but narrowed above, first recurrent ends at middle of second submarginal, second recurrent ends before middle of third submarginal, basal and transverse widely disjointed.

Length 5 mm., fore wing 5 mm.

One from Mt. Lemon, Santa Catalina Mts., Arizona, 6000 ft., 27 July (J. Bequaert). Type M.C.Z. 17043.

A female taken at same time is wholly black with blackish wings; its structure is closely similar to the male; it may be the female of the species.

Priocnemis arizonica sp. nov.

♀ Very similar to *P. facetus* except that the abdomen is wholly black, and no band over the basal and transverse nervure of the forewing. Head, thorax, legs, and antennæ yellowish, tips of hind tibiæ, and tips of hind tarsal joints darker, forewings with a dark cloud behind the marginal cell and another over the tip of wing, veins brown, elsewhere and the hind wing hyaline.

Clypeus broad, rounded below, clothed with yellowish hair; antennæ a little longer than in *P. facetus,* third joint a trifle longer than the fourth; ocelli subequal, posteriors nearer to each other than to the eyes; vertex nearly straight across, with two or three erect hairs each side; occiput with scattered pale hairs, similar ones on prosternum and front coxæ; pronotum rounded behind as in *facetus;* propodeum with some white pubescence each side behind near tip, also silvery pubescence on most of the pleura, and on middle and hind coxæ. Front tibia with a few bristles beneath, mid tibia with two rows of a few bristles above, hind tibia with two rows or eight or nine small, but distinct, teeth above, each tipped with a bristle; inner spur of hind tibia about two-thirds of the basitarsus. Marginal cell of fore wings pointed at tip, not its length from tip of wing, and extending as far out as the tip of the third submarginal cell; second submarginal a little longer than high, third much longer, but upper side only about two-thirds of lower side, first and second recurrent veins end at middle of second and third submarginal cells, second recurrent only faintly sinuate, basal and transverse slightly disjointed.

Length 7.5 mm., fore wing 5.5 mm.

From Tempe, Arizona, 2 Aug. (J. Bequaert).

Type M.C.Z. 17044.

Priocnemis navajo sp. nov.

♀ Black throughout, abdomen polished, thorax and head finely punctate; wings dark, but darkest on tip, and in second and third submarginal cells and in the second discoidal, similar to *P. conicus.* Clypeus broad, truncate below; ocelli subequal, posteriors a little nearer each other than to eyes; vertex nearly straight across, with a few erect hairs, a few hairs on face; third joint of antennæ not as long as first and second combined; hind margin of pronotum scarcely angulate in middle; propodeum at first nearly flat, then down-curved, without noticeable long hairs above; pleura also devoid of hairs. Abdomen without hairs except near tip and on venter; front coxæ with some long hairs, other coxæ without hairs, mid tibia spinulate above, hind tibia with the teeth and bristles like *P. conicus,* but not so large, inner spur of hind tibia about two-thirds of the basitarsus. Fore wings with marginal cell more rounded at tip, not near as pointed as *P. conicus,* about length of cell from tip of wing, stigma much shorter than in *P. conicus,* third submarginal shorter than in *P. conicus,* more like *P. pompilus,* first recurrent ends beyond middle of second submarginal, second recurrent ends a little before middle of third submarginal.

Length 7 mm., fore wing 5.5 mm.

From Apache Camp, Santa Catalina Mts., Arizona, 5500 ft., 25 July (J. Bequaert).

Differs from *P. conicus* in being less hairy, especially noticeable on mid and hind coxæ and thoracic notum; from *P. pompilus* in being more hairy, especially the front coxæ, from both species it differs by the shorter, more rounded tip of marginal cell and the shorter third joint of the antennæ.

Type M.C.Z. 17945.

Deuteragenia pilosa sp. nov.

♀ Body black, with much pale hair, even on the middle of abdomen above with erect hairs; antennæ pale yellowish on base, brown beyond; mandibles pale; front legs (including coxæ) yellowish, other legs brown, the tarsi and mid tibia at tip paler, spurs brown; wings hyaline, marked with dark bands as in *D. caliptera.* Face with appressed gray pubescence, and also erect hairs, hair-basket brown; clypeus broad, truncate in front, with some long hairs; ocelli subequal, in a moderately low triangle, posteriors scarcely closer to each other than to eyes; pronotum rather long, longer than in *D. caliptera,* scarcely angulate behind; antennæ slender, third joint one-fourth longer than the fourth, equal to first and second together; propodeum silvery each side behind, and with some short erect hairs, scarcely a trace of transverse striæ on the propodeum, and no sign of a median furrow; pleura also with fine erect hairs; front coxæ with rather short hairs in front, mid and hind tibiæ not as strongly spinulate above as in *D. caliptera,* inner spur of hind tibia less than two-fifths of the basitarsus; abdomen moderately elongate, with some erect hairs on nearly all segments above as well as below. Wings closely resemble those of *D. caliptera* and the venation is practically the same.

Length 7 mm., fore wing 6.5 mm.

From Lafayette, Indiana, 10 July (J. Bequaert). Type M.C.Z. 17046.

Deuteragenia papago sp. nov.

♀ Black, with some whitish pubescence, but most of the abdomen is shining; wings wholly evenly dark; hair-basket of brown hairs. Clypeus broad, truncate in front; vertex nearly straight across; ocelli subequal, in a low triangle, posteriors plainly farther apart than from the eyes; third joint of the antennæ not as long as first and second combined; pronotum arcuate behind, mesonotum with two fine parallel lines each side, propodeum plainly striate (more so than in *D. caliptera*), with erect white hairs; all coxæ and femora with some white hairs, tibia spinulate above as in *D. caliptera.* Abdomen with erect white hairs on basal segment above, and longer, more numerous hairs near tip, venter also with hairs.

Wings, uniformly fuscous, veins dark brown; marginal cell long and pointed, second and third submarginals short as in *D. caliptera;* first recurrent ends at middle of second submarginal, second recurrent ends much before middle of third submarginal, second discoidal thereby shorter than in *D. caliptera,* basal nervure interstitial with the transverse.

Length 8.5 mm., fore wing 7 mm.

From Southern Arizona (J. Bequaert). Readily separated by the uniform dark wings. Type M.C.Z. 17047.

Our four species of this genus can be separated as follows:

1—Wings wholly dark; hair-basket brown, body and legs and antennæ wholly black .... *papago*
Wings hyaline with two dark bands, or clouds 2

2—Hair-basket white; face and thorax with yellowish pubescence, pronotum arcuate behind; third and fourth section of marginal vein straight and oblique; spots in wing rather faint .... *brevis*
Hair-basket brown; face with gray or whitish pubescence; pronotum slightly angulate behind; third and fourth section of marginal vein somewhat curved, spots in wing very dark and distinct 3

3—Front legs and basal part of antennæ yellowish; abdomen hairy above; propodeum without median groove and no transverse striæ .... *pilosa*
Front legs and antennæ black; abdomen hairy only at tip, propodeum with median groove and transverse striæ .... *caliptera*

Phanagenia gen. nov.

Intermediate between Ageniella and Cryptocheilus. Discoidal cell without pocket; second ventral segment with strong transverse furrow; hind tibiæ with rows of small but distinct bristles above, but no teeth; last joint of hind tarsus with spines beneath in middle as other joints, marginal cell rather long and tip pointed and less than its length from tip of wing, basal disjointed from transverse nervule, claws with a tooth near middle.

Type *P. osceola* n. sp.

The last joint of the hind tarsus allies it to Cryptocheilus, but the very weak spines on the hind tibia with Ageniella. The genus includes also *Ageniella coronata* Fox, from California, and the Eastern *Ageniella bombycina* Cress.

Phanagenia osceola sp. nov.

♀ Black, in some parts with purplish reflections, tips of antennæ paler. Clypeus broadly rounded below, with appressed hair and long erect hairs in front; vertex faintly arcuate, with a few erect hairs each side, and four in the middle; anterior ocellus rather larger than the others, posteriors a little nearer to each other than to the eyes; third joint of antennæ very long, fully one-half longer than the fourth; occiput without long hair; pronotum angulate behind, with a very few fine erect hairs above; pleura with very fine short hairs; propodeum low, evenly curved, without hairs except very fine short ones each side near tip. Legs moderately long, front coxæ with some fine long hairs in front, front tibia with minute spines below almost to the base, mid tibia with short stiff bristles above in two rows and others on sides and below, hind tibia spined in the same manner, inner spur of hind tibia not two-fifths of the very long basitarsus. Abdomen fusiform, with fine hair near tip and on apical part of venter.

Fore wings with a long marginal cell, its tip nearly as far out as the tip of third submarginal cell; stigma wholly dark, very long, nearly four times as long as broad (longer than in *P. bombycina*); second submarginal over once and a half as long as high, third submarginal longer below but not above; first recurrent ends in the second submarginal beyond middle, second recurrent ends before middle of the third submarginal; basal less disjointed from the transverse than in *P. bombycina,* and the transverse is more oblique than in that species, lower part of the basal much bowed, more than in *P. bombycina.*

Length 13 mm., fore wing 11 mm.

From Miami, Florida (A. E. Wight). Type M.C.Z. 17048.

MERMIS PARASITISM IN SOME AUSTRALIAN AND MEXICAN ANTS

By William Morton Wheeler

Harvard University, Cambridge, Mass.

Since reviewing in several former papers[1] the modifications induced in ants by Nematode worms of the genus Mermis, I have obtained mermithized specimens of four additional species. Three of these are from Australia, a continent from which no cases of this form of parasitism had been previously recorded. The fourth case, from Mexico, partially bridges a gap in the known distribution of ant-mermithization extending from New England and Colorado to Argentina. In the Old World no cases are known from Asia, Indonesia and Papua, but their occurrence in these regions will be revealed in all probability by examination of sufficient material.

Myrmecia forficata Fabr.
var. **rubra** Forel

While I was visiting Mr. John Clark in Melbourne, Victoria, during December, 1931, he presented me with a dried mermithogyne of this large Ponerine ant and informed me that he had seen others. The specimen was taken at Belgrave, Victoria, Jan. 29. It has the appearance of a normal deälated female, but the gaster is unusually voluminous and the postpetiole is very broad, being nearly twice as wide as long. Although the thorax is of the normal female structure, I can find no evidence that the specimen has ever borne developed wings. The tegulæ are normal, but each fore wing is represented by a small, hard, jet-black tubercle. There is no trace of a hind wing on the left side, but the right hind wing appears to be represented by a minute rounded tubercle near the lateral border of the metanotum. If my interpretation is correct, we may suppose that the reducing effect of the Mermis on the wings is very much greater in Myrmecia than it is in the mermithogynes of Lasius, which have these appendages merely reduced to about half or one-third their normal size.

---

[1] W. M. Wheeler, Mermis Parasitism and Intercastes among Ants, Journ. Exper. Zoölogy 50, 1928, pp. 165-237, 17 figs.; A Camponotus Mermithergate from Argentina, Psyche 36, 1929, pp. 102-106, 1 fig., and Two Mermithergates of Ectatomma, *ibid*. 37, 1930, pp. 48-54, 1 fig.

I have not seen the normal female of *rubra*, which is described by Clark as very slightly larger than the worker (19-23 mm.) as contrasted with the female of the typical *M. forficata* Fabr., which is considerably larger than its worker. I therefore compare the dimensions of the mermithogyne with those of the females of the very closely related *forficata, lucida* Forel and *regularis* Crawley. A *lucida* female from Hobart, Tasmania (G. H. Hardy) measures nearly 20 mm., its gaster 6 mm. in length and nearly 4 mm. in dorsoventral diameter, the head including the mandibles 6.5 mm., in diameter through the eyes 4 mm. Normal females of *forficata* from New South Wales and Victoria measure about 22 mm., the gaster nearly 7 mm., dorsoventrally nearly 4 mm., the head including the mandibles 6 mm., through the eyes 3.8 mm. The average female of *regularis* from Southwestern Australia measures 18-19 mm. in length; gaster 6 mm., dorsoventrally 3.5 mm.; head with mandibles 6 mm., through the eyes nearly 4 mm. The *rubra* mermithogyne measures nearly 24 mm.; its gaster 9 mm., dorsoventrally 5.5 mm.; the head with mandibles 6 mm., through the eyes 3.6 mm. This specimen therefore shows little modification as the result of parasitism compared with normal females of the closely allied species, except in the greater size of the postpetiole and gaster and its almost complete aptery. Probably, however, the head and thorax are distinctly narrower than in the unparasitized *rubra* female. The extreme, red bases of the gastric segments are exposed and through them portions of a coiled Mermis are distinctly discernible.

Camponotus (*Tanæmyrmex*) **consobrinus** Erichson

(Fig. 1)

The synonymy of this common and widely distributed Australian Camponotus, which comprises several subspecies and varieties and constitutes a well-defined group in the subgenus Tanæmyrmex, has been confused through failure to recognize the type. This was supposed to be *C. nigriceps* F. Smith (1858), but recently Mr. John Clark has been able to identify Erichson's *consobrinus*, which was described as early as 1841. He has therefore suggested the following arrangement of the various subspecies and varieties to replace Emery's arrangement in the "Genera Insectorum."

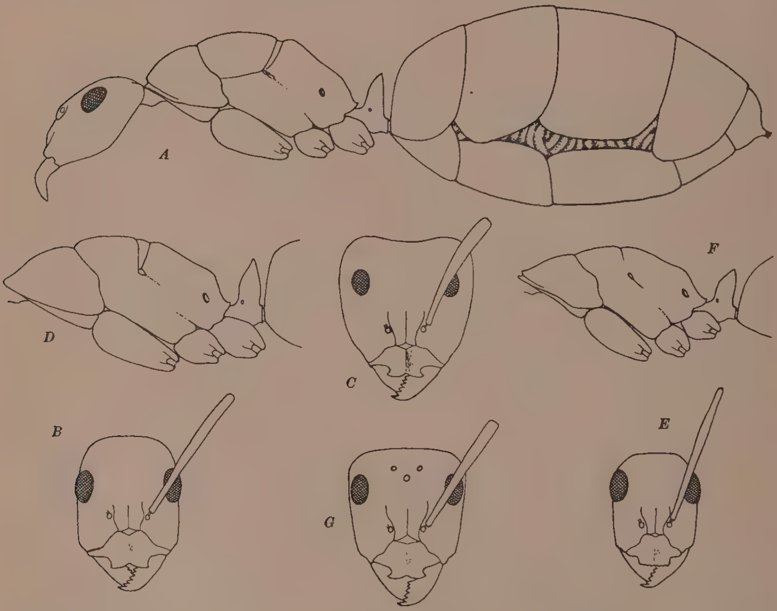


Fig. 1. *Camponotus (Tanæmyrmex) consobrinus* Erichson. *A*, mermithergate (specimen g), in profile; *B*, head of same, dorsal view; *C*, head of worker maxima, dorsal view; *D*, thorax and petiole of same, in profile; *E*, head of worker minima, dorsal view; *F*, thorax and petiole of same, in profile; *G*, head of female, dorsal view.

C. (*T.*) *consobrinus* Erichson (1841). Type locality: Tasmania (= *dimidiatus* Roger, 1858). Common in New South Wales and Queensland.
var. *obniger* Forel (1902). New South Wales.
var. *perthianus* Forel (1915). Western Australia.

Subsp. *lividipes* Emery (1887). New South Wales.
(= *prostans* Forel, 1907).

Subsp. *nigriceps* F. Smith (1858). Southeastern, South and Western Australia.
var. *pallidiceps* Emery (1887). New South Wales.
(= var. *clarior* Forel, 1902). Western Australia.

I have taken all of the six valid forms of *consobrinus* in various localities. They nest in open places in the soil under large flat stones, often in rather populous colonies. The largest workers are not very aggressive. Like many of the other Australian Camponoti they are often common in restricted areas and, like many other species of Tanæmyrmex, seem all to be nocturnal foragers.

In four colonies of the typical *C. consobrinus* (*dimidiatus*) among about 20 which I examined on December 14 and 15, 1931 at the Creel, (alt. 3000 ft.) at the base of Mt. Kosciusko, N. S. W., eight mermithergates were taken. Each of two colonies contained only one, one colony contained two and another four of the parasitized individuals. Owing to their large size and swollen gasters they were conspicuous among their normal sisters in the superficial galleries of the nests and were quite as alert in escaping when the stones were overturned. The colonies also contained considerable brood, a few males and immature winged females. Dr. P. J. Darlington has recently brought me a ninth mermithergate of *consobrinus,* which he took March 16, 1932, with a portion of the colony in the McPherson Range, below the National Park in Queensland.

The following are the average measurements (total length and length of gaster) of alcoholic material of the three normal worker forms of *consobrinus*:

Maxima: Length 13-14 mm.; gaster 4-5 mm.
Media: Length 10-11 mm.; gaster 3-3.5 mm.
Minima: Length 8-9 mm.; gaster 2.5-3 mm.

The nine mermithergates (in alcohol), which I designate by letters (*i* being the specimen from Queensland), had the following dimensions:

(a) Length 12 mm.; gaster 6.5 mm.
(b) Length 14 mm.; gaster 7 mm.
(c) Length 15 mm.; gaster 6 mm.
(d) Length 15 mm.; gaster 7 mm.
(e) Length 15 mm.; gaster 7 mm.
(f) Length 15.8 mm.; gaster 7.5 mm.
(g) Length 16 mm.; gaster 6.5 mm.
(h) Length 16.7 mm.; gaster 8 mm.
(i) Length 18 mm.; gaster 9 mm.

With the exception of (c) and (d), all the specimens have the gaster so greatly distended with Mermis that the white intersegmental membranes are more or less exposed; the two exceptions seem to have lost their Nematodes, though their gasters are decidedly enlarged. It will be seen that, with the exception of (a) and (b), all the specimens are longer than the largest normal maxima workers. Yet all have the aspect of large minima workers with abnormal gastric distension. Closer examination, however, shows that they represent a distinct intercaste, in the sense in which I used that term in my paper of 1928, because, while the head is much like that of the minima, the thorax and petiole are clearly of the media and maxima type. The head is somewhat broader than in the smallest minimæ and in several of the specimens less smooth and more sharply shagreened, and all have a faint pit in the place of the anterior ocellus. These are characters of the normal maxima. Specimen (i), however, has three very distinct ocellar pits. The clypeal carina, well-developed in all the normal worker castes, is undeveloped in the mermithergates and reduced to a blunt, elongate, median boss as in the normal female. The sides of the head are also distinctly less convex than in the minima and therefore more like the conditions in the female. The thorax is like that of the maxima, being stouter through the pronotum, higher and more convex in profile, with the epinotum proportionally shorter and more rounded, with less distinct base and declivity than in the minima. The lateral suture of the mesonotum, which is absent in the maxima but well-developed in the female, is distinct in specimens (b), (e), (g) and (i) and faintly indicated in some of the others. There is a distinct though small metanotal sclerite like that of the maxima (absent in the minima), and the foveolæ on the pronotum are also stronger and more numerous as in that caste. In two of the mermithergates, (b) and (g), the metanotum is decidedly larger and broader than in the normal maxima and therefore more as in the female. In (g) even the scutellum of the latter seems to be indicated by faint lateral impressions but not by a suture marking it off from the mesonotal scutum. The petiole of all the mermithergates is like that

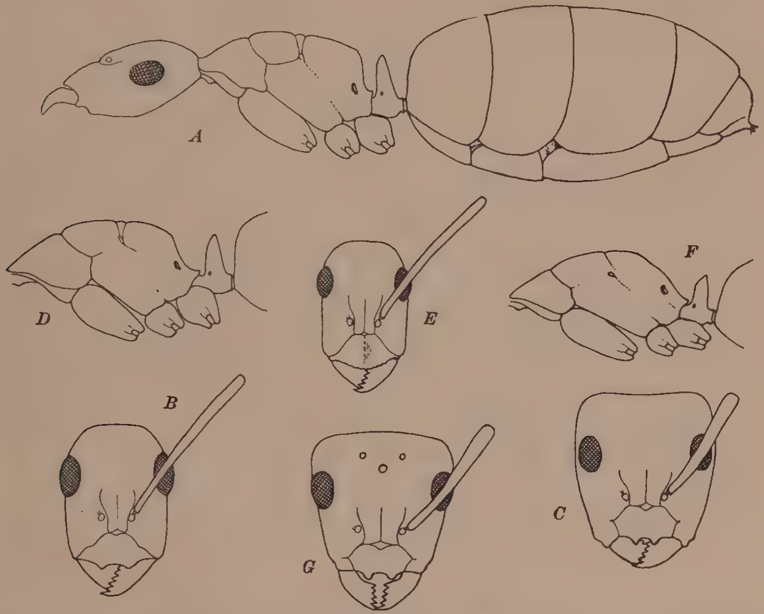


Fig. 2. *Camponotus (Myrmophyma) claripes* Mayr subsp. *piperatus* subsp. nov. *A,* mermithergate, in profile; *B,* head of same, dorsal view; *C,* head of worker maxima, dorsal view; *D,* Thorax and petiole of same, in profile; *E,* head of worker minima, dorsal view; *F,* thorax and petiole of same, in profile; *G,* head of female, dorsal view.

of the normal media and maxima in being stouter, broader and with more broadly rounded apical border than in the minima. In (h) this border is even very feebly emarginate in the middle as in some maximæ. The coloration and pilosity of all the mermithergates is that of the normal maxima, media and minima, except (d) and (h), which have the posterior corners of the head red.

Camponotus (*Myrmophyma*) **claripes** Mayr. (Fig. 2)

C. claripes is one of the most variable and widely distributed of the Australian Camponoti. It is an inoffensive ant which lives in the soil under stones and logs in rather small colonies. According to my observations, the worker media is either extremely rare or nonexistent, as in many species of the subgenus Colobopsis, so that the worker caste is sharply divided into minimæ and maximæ. Since the typical *claripes* was described by Mayr in 1876 from Peak Downs, Queensland, seven subspecies and varieties have been added by Forel, Viehmeyer and Crawley, but the material in my collection shows that these by no means exhaust the existing variants. Although the species needs revision, I here describe only one of the hitherto unrecorded forms, because it yielded a mermithized specimen.

Camponotus (*Myrmophyma*) **claripes** Mayr
subsp. **piperatus** subsp. nov.

Worker maxima. Length 8-10 mm.

Head shaped as in the typical *claripes*, but with slightly more convex sides; thorax shorter and higher, especially at the epinotum, which has a much steeper concave declivity, distinctly longer than the convex base. Punctures on the subopaque clypeus and cheeks smaller, more superficial and not elongated. Pilosity as in the type, but somewhat less abundant on the cheeks. Color brownish ivory yellow, legs paler; tip of gaster, a band across each of its more anterior segments, apex of the petiolar node, epinotum, sides of the mesonotum and more or less of the dorsal surface of the head brown or dark brown, the pronotum and paler portions of the gaster spotted with brown; tips of mandibles, antennal funiculi, tarsi, knees and tips of tibiæ, clypeus, gula, corners of the head, and a broad transverse band on each cheek yellowish or brownish red.

Worker minima. Length 4-6 mm.

Smaller than the minima of the typical *claripes*, with distinctly broader head and shorter and more convex thorax, the base of the epinotum more rounded and less distinctly marked off from the declivity. Ivory yellow, legs somewhat paler and more whitish; mandibles, funiculi, tarsi, knees and tips of tibiæ reddish; posterior third or fourth of the head, dorsal border of petiole and two last segments of the gaster dark brown; each of the gastric segments with a narrow posterior brown fascia, the remainder of its dorsal surface and that of the thorax spotted with brown.

Female. Length 11-12 mm.

Closely resembling the female *claripes* in form, but the sculpture of the clypeus and cheeks as in the maxima. Head similarly colored, but the thorax dark brown, except the pronotum and mesosterna, which are dull ivory yellow, spotted with brown; gaster dark brown with only the anterior and posterior borders of the segments and the anterior surface of the first segment ivory yellow, the latter with brown spots. Wings long (12 mm.), distinctly infuscated, and as in the typical *claripes*, with resin-brown veins and pterostigma.

South Australia: Mt. Lofty, type locality (Wheeler) ♃ ☿ ♀; Adelaide (F. R. Zietz, A. M. Lea) ♃ ☿ ♀; Belair (J. W. Haacke) ♀.

Victoria: Sea Lake and Ultima (J. C. Goudie) ♃ ☿.

New South Wales: The Creel, Mt. Kosciusko, 3000 ft. (Wheeler) ♃ ☿ ♀; Jenolan Caves (J. C. Wiburd) ♃ ☿; Katoomba (Wheeler) ♃ ☿.

Some of these series show departures in coloration, but they are not sufficiently constant to justify distinct varietal names. Thus the maximæ from the two localities in Victoria have the gaster almost entirely dark brown, and those from Katoomba not only show considerable variation in the amount of dark brown in the gaster, but often have the entire head reddish yellow, with the exception of a median spot on the vertex.

The single mermithergate of *C. piperatus* was taken December 14, 1931, from a small colony at the Creel on Mt. Kosciusko on the same hillside as the eight *consobrinus* mermithergates described above. It measures 10.3 mm. and is therefore somewhat longer than the normal maxima. The head measures 1.6 mm., the gaster, containing a well-developed Mermis, 5.3 mm. The general aspect of the specimen is that of a huge minima, but the head is distinctly broader in proportion to its length and the thorax and petiole are those of a maxima. The thorax has a distinct metathoracic sclerite and the epinotum is high, with a perceptible angle between the base and declivity. The petiolar node is robust, with a feebly notched superior border. The anterior portion of the head approaches that of the maxima in having a more uneven and more coarsely punctate surface than the minima. The color, too, is like that of the maxima, since the mesonotum and posterior portion of the epinotum are dark brown. The gaster is very pale even at the tip; the brown spots are pronounced on the pronotum, but pale and scattered on the gaster. Except for the smaller and narrower head, the specimen might be said to resemble a media, but this subcaste, as previously stated, does not seem to exist in *claripes*.

Camponotus (*Myrmothrix*) **abdominalis** Fabr.
subsp. **stercorarius** Forel (Fig. 3)

C. abdominalis is a common and very aggressive, neotropical ant, quite as variable and widely distributed as the two Australian species above noticed. It ranges from southern Florida and Texas to southern Brazil as a "Formenkreis" embracing no less than 13 subspecies and 5 varieties. Most of these forms nest in moderately large colonies in dead branches or rotten wood, but some of them live, at least temporarily, in the ground under stones. This is true of the subspecies *floridensis* Buckley of Florida and the Central American and Mexican *stercorarius*. Forel (1884) long ago described the nesting habits of the latter from observations made by Stoll in Guatemala as follows: "This race is abundant in Central America. Mr. Stoll found it and varieties transitional to *esuriens* very common in the environs of Guatemala City and Antigua (cities at an altitude, with cool climate), making its nest in dry cowdung and often also under stones. Mr. Stoll has also found small formicaries of *C. stercorarius* established in the large dried fruits of *Lucuma mammosum* that had fallen to the ground. These fruits have a hard rind 15 cm. long enclosing a soft pulp and a hard pit 7 to 8 cm. in length. The ants with their larvæ and cocoons simply occupied the cavity of the fruit from which they had probably removed the pulp."

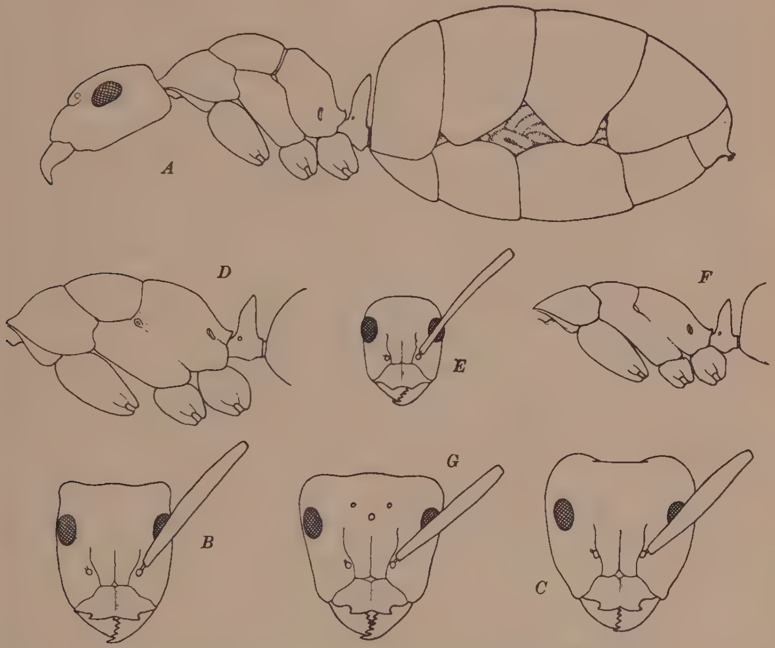


Fig. 3. *Camponotus (Myrmothrix) abdominalis* Fabr. subsp. *stercorarius* Forel. *A*, mermithergate, in profile; *B*, head of same, dorsal view; *C*, head of worker maxima, dorsal view; *D*, thorax and petiole of same, in profile; *E*, head of worker minima, dorsal view; *F*, thorax and petiole of same, in profile; *G*, head of female, dorsal view.

An interesting mermithergate of *stercorarius* was sent me, with a portion of the colony in which it was living, by Dr. Wolfgang von Hagen, who took it during September, 1932, in the state of Guerrero, Mexico. It differs from the mermithergates of *consobrinus* and *piperatus* in being more clearly a modified maxima with some of the characters of the female. Though smaller and narrower, the head combines the characters of these two castes as shown by its sculpture, the shape of the antennæ, mandibles, clypeus, frontal carinæ, etc. The normal maxima measures 12-13 mm., its petiole and gaster 4-4.5 mm., its head, including the mandibles 4.6 x 3.5 mm. The normal female is 14-15 mm. long, the gaster and petiole 6.5 mm., the head 3.5 x 3 mm. The corresponding measurements of the mermithergate are: total length (in alcohol) 15 mm.; gaster and petiole 7 mm.; head 3.5 x 2.5 mm. Its head is decidely longer than broad, nearly as broad in front as behind, with rather straight subparallel sides, the posterior border less concave than in the maxima, the posterior corners rectangular as in the female, but with a distinct transverse impression on each side just behind the eye. This impression is absent in all the normal female castes. Eyes larger, more convex and situated more laterally when the head is viewed from above than in the maxima and therefore more like those of the female. There are no traces of ocelli. Mandibles convex like those of the maxima, with coarse teeth, but the terminal tooth is longer, as in the female. Antennal scapes stout and distinctly flattened distally as in the large media, maxima and female, extending half their length beyond the posterior border of the head (in the maxima less than ⅓, in the female about ⅖). Clypeus shaped as in the maxima, carinate, but with the anterior lobe shorter though angularly excised in the middle and strongly toothed at each lateral corner. Thorax also like that of the maxima, but smaller, shorter and somewhat more convex in the mesonotal region, with more sloping base to the epinotum. Metanotal sclerite very short as in the maxima but more distinct owing to the more pronounced mesoëpinotal impression. Petiole decidedly larger and broader than in the maxima, its superior border distinctly notched in the middle, so that it is very similar to the petiole of the female. Gaster very large and swollen, even larger than in the virgin female, with the dorsal sclerites more or less separated, revealing the coils of one or more Nematodes through the tense intersegmental membrane. Legs longer than in the maxima, median and hind femora more slender. Sculpture, pilosity and color as in the maxima but the sides of the pro- and mesonotum with some coarse elongate grooves which are found neither in any of the normal worker forms nor in the female. Similar but finer, parallel grooves occur on the dorsal sclerites of the three first gastric segments. Traces of these grooves occur, however, on the first gastric segment of some maximæ and on the first and second segments of the female.

The thirteen known mermithergates, representing five species of Camponotus, namely the three above described, *C.* (*Tanæmyrmex*) *punctulatus* Mayr subsp. *minutior* Forel of the Argentine and *C.* (*T.*) *pompeius* Emery subsp. *cassius* Wheeler of the Congo, are all very similar, if we omit the last, which is merely a parasitized worker minima. Each of them exhibits a combination of worker maxima, worker minima and queen characters in the structure of the head, thorax, petiole and appendages, and may be said, therefore, to represent a pathological "intercaste" produced by Mermis infestation. The queen characters are less pronounced in the mermithergates of Camponotus than in those of Pheidole, which may even possess small ocelli. The late Dr. N. A. Cobb showed that the young Nematodes enter the body-cavity of the ant-larva. They probably undergo little growth or development till the larva is well advanced, but the disturbance they set up in the prepupal and pupal development of the host suffices to bring about a considerable diminution in the size of the head and thorax and a simultaneous greater differentiation of the latter region in the imaginal ant. The series of nine mermithergates of *C. consobrinus* probably arose from a series of larvæ that were, when attacked by the Mermis, at various points on the road to development as normal media and maxima workers or had even begun to develop as queens.

TRICHOPTERA FROM THE MOUNTAINS OF NORTH CAROLINA AND TENNESSEE

By F. M. Carpenter

Museum of Comparative Zoology

The caddis-flies listed in this paper were collected by Professor Nathan Banks, Dr. P. J. Darlington, Jr., and the writer in the Black Mountains of North Carolina and the Smoky Mountains of North Carolina and Tennessee during August and September of 1930. Several specimens collected by Dr. and Mrs. W. S. Creighton in the Black Mountains at about the same time are also included. For the opportunity of studying this material and for many helpful suggestions, I am indebted to Professor Banks. The types of all new species are deposited in the Museum of Comparative Zoology.

The summer of 1930 was very dry in the southern Appalachian region and as a consequence caddis-flies were not very abundant. But about two hundred and fifty specimens were collected, belonging to twenty-three species, including five new ones, as well as three new genera. Several species previously known only from the types were taken in considerable numbers, and both sexes of other species formerly known only by one sex were also secured.

LIMNEPHILIDÆ

Neophylax mitchelli n. sp.

Text-figure 1

♂ Length of fore wing, 7 mm. Vertex and frons yellow; antennæ light yellow; hairs on head and antennæ golden-yellow; maxillary palpi yellow; basal segments of maxillary palpi not much thicker than the other segments; thorax light reddish brown; abdomen dark reddish brown above, light brown laterally and ventrally; legs light brown. Fore wing: yellowish, with areas of gray or shading; one large light yellow spot on the posterior border; outer margin bordered with gray, the center of the wing more or less maculate; venation as in other members of this genus, Rs forking close to its origin. Hind wing: M reduced as in all other males of Neophylax; M_{3+4} is in actual contact with Cu1 for a short distance; M is free from Rs for its entire length, arising independently from the base of the wing. The hind wing is uniformly light yellow.

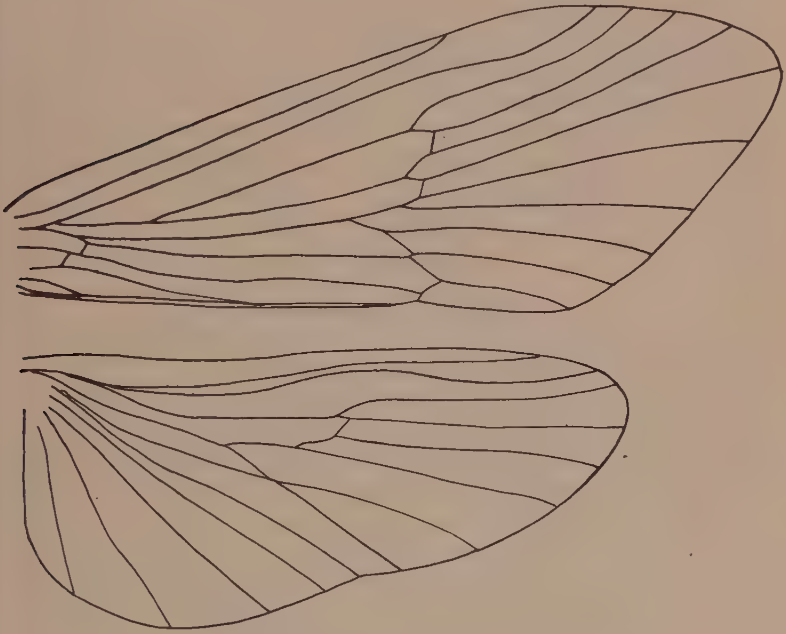


Fig. 1. Venation of *Neophylax mitchelli,* n. sp.

Holotype (♂): Mt. Mitchell, Black Mountains, N. Carolina, at 5000-6711 ft., Sept. 1, 1930; N. Banks, collector.

This species differs from the previously described members of Neophylax by its color markings and particularly by the free basal part of M in the hind wing. In all other

American species of Neophylax the stem of M fuses with Rs just a little basad of the fork of M. The condition in *mitchelli* is quite unique and probably should rank as a subgeneric division. The spur formula of the type is 1, 2, 3 instead of 1, 2, 4 as usual in the genus. This in all probability is also a subgeneric characteristic, but additional specimens may show that it is only an individual feature and subject to variation.

Allegophylax subfasciatus Say

This common eastern species was taken at three localities: Deep Creek, Bryson City, N. Carolina, 2000 ft., Aug. 20, 27; Newfound Gap, Smoky Mts., Tennessee, 5000-5200 ft., Sept. 1; and on the state road to Newfound Gap, Tennessee, at 3500 ft., Sept. 3.

SERICOSTOMATIDÆ

Notiopsyche Banks

Banks, 1905, Bull. Amer. Mus. Nat. Hist., 21:216.
Banks, 1905, Trans. Amer. Ent. Soc., 32:11.

♂ Spurs 2, 4, 4; ocelli absent; maxillary palpi short and flattened, covered with scales; labial palpi long and slender; basal segment of antennæ longer than head and covered with scales and stout hairs. Fore wing: costal area of wing rather broad, the margin slightly recurved and bearing a series of long hairs, some of which extend backwards to about the middle of the wing; all four branches of Rs present; M with three branches, M1, M2, and M3+4; Cu1 unbranched. Hind wing; costal margin slightly recurved and bearing short recurved hairs; Rs with four branches, M with only two; Cu1 forked.

♀ Similar to the male, except for the following: the maxillary palpi are 5-segmented and normal in shape; basal segment of antennæ long, bearing long hairs, but no scales; the anterior margin of the fore wing is normal and lacks the long, recurved hairs.

Genotype: *Notiopsyche latipennis* Banks.

Banks originally established this genus for *latipennis,* and later (1911) placed another species here (*carolina*). *Latipennis* has previously been known only by the male type, but in the new material obtained in 1930, there are fifteen more specimens belonging to both sexes, which have enabled me to prepare a more complete description of the male and to describe the female for the first time. *Carolina* is known only by the three male types, all from Southern Pines, North Carolina, there being no additional specimens from the mountainous regions of that state. From my examination of these types, which are in the Museum of Comparative Zoology, I am convinced that *carolina* does not belong to Notiopsyche, but to an undescribed, aberrant genus, which I propose to call *Oligopsyche.* The characteristics of that genus will be considered below.

Notiopsyche latipennis Banks

Figure 14.

1905, Bull. Amer. Mus. Nat. Hist. **21**; 216.

1905, Trans. Amer. Ent. Soc. **32**: 11; pl. 2, fig. 20 (forewing), fig. 27 (♂ genitalia).

♂ Length of fore wing, 8 mm. Face grayish brown; antennæ mostly yellow-brown, the distal edge of each segment dark brown; basal segment dark brown and covered with brown scales and hairs; maxillary palpi movable, bearing yellow scales in the upper surface and dark brown hair and slender scales below; legs and thorax yellowish brown; wings uniformly gray; the anterior margin bearing long yellow hairs, some of which extend backward as far as the middle of the wing; veins and some membraneous areas of the wings bear flat, scale-like hairs. Forewing[1]: fork R4+5 deeper than R2+3; M1+2 divide below the separation of R4+5. The male genitalia have been figured by Banks.

♀ Similar to the male in size, coloration and venation, exclusive of the secondary sexual characters mentioned in the generic description.

---

[1] The figure of the wing of this insect given by Banks (1905) is not quite correct, and the figure of both fore and hind wing published by Ulmer in the Genera Insectorum (pl. 13, fig. 114) is likewise incorrect. Ulmer accidently labels this wing *Notiopsyche mexicana.*

Holotype (♂): Black Mt., North Carolina, June; in the Museum of Comparative Zoology.

Allotype, by present designation: Bryson City, Deep Creek, North Carolina, 2000 ft., Aug. 25, 1930; N. Banks, collector.

In addition to the allotype, 11 specimens were collected in 1930: 9 at Bryson City, North Carolina, from Aug. 25-27; 1 at Smokemont, North Carolina, 2000 ft., Aug. 24; and 1 at Newfound Gap, Smoky Mts., Tennessee, 5000-5200 ft., Sept. 1.

Oligopsyche, new genus

♂ Spurs, 2, 4, 4; ocelli absent; mouth-parts vestigial, the maxillary palpi reduced to a pair of small papillæ bearing a few short hairs; mandibles and labrum completely absent; labial palpi short, with 3 segments; basal segment of antennæ slender, long, and very hairy; fore wings broad, and bearing a prominent fringe of light yellow hairs; Rs arising close to base of wing; M fused with Rs at the base; Rs and M with two branches each; Cu unbranched. Female unknown.

Genotype: *Notiopsyche carolina* Banks. The genitalia have been figured by Banks (1911).

The species for which this genus is established is one of the most unusual in the family Sericostomatidæ. One of the outstanding features of the members of the family is the elaboration of the maxillary palpi of the male, which are usually enlarged. In *carolina*, the opposite condition has been developed; the palpi are almost entirely lost. This reduction of the palpi is probably a part of the much greater modification, the atrophy of all the mouth-parts. The venation is also much more reduced than is usual in the Sericostomatids.

Phanopsyche grisea Banks

Trans. Amer. Ent. Soc., 1911, 37: 357; fig. 17 (wing), fig. 22 (genitalia).

Four specimens of this species were collected at Newfound Gap, 5000-5200 ft., Smoky Mts., Tennessee; Aug. 30, 31; one at Bryson City, Deep Creek, 2000 ft., North Carolina, Aug. 26; and 1 at Nantahala Gorge, North Carolina, August 25. This series of specimens greatly extends the range of *grisea,* which has previously been recorded only from New York and New Jersey.

Goera calcarata Banks

Figures 8, 13.

Trans. Amer. Ent. Soc. 25: 211, 1899.

One female of this species was collected at Andrews, North Carolina, 1800 ft., Aug. 25. *Calcarata* was originally described from a single female from Sea Cliff, New York, and is represented in the collections at the Museum of Comparative Zoology by several additional specimens from New Jersey, Massachusetts, and New York. Since the male has not previously been described, I take this opportunity to do so.

♂ Spurs 2, 4, 4. Head dark reddish brown; basal segment of antennæ thickened and a little longer than the head hairy, and slightly scaly; palpi light brown, cylindrical, fleshy, almost hairless, except at top, where there is a cluster of long, light yellow hairs; thorax reddish brown; legs yellow. The venation, which is shown in figure 13, is the same as in the female. The male genitalia are illustrated in figure 8.

Allotype, by present designation: Ramsey, New Jersey, July 27, 1917; in Museum of Comparative Zoology.

Pseudogoera, new genus (*Goerinæ*)

♂ Spurs 2, 4, 4; ocelli absent, maxillary palpi slender, cylindrical, covered with long hairs; basal segment of antennæ thickened, but not so long as the head. Fore wing: R1 connected to R2 by an oblique cross-vein below the pterostigmal region; Rs with two branches, M with four; Cu1 unbranched.

Genotype: *Pseudogoera singularis,* n. sp.

Pseudogoera singularis, n. sp.

Figures 2, 12.

♂ Length of fore wing, 6-7 mm.; vertex and frons dark brown; antennæ light brown, the basal segment covered with long, dark brown hairs; maxillary palpi grayish, with long dark gray hairs, those at the base being the longest; labial palpi long, gray; thorax light brown, abdomen dark reddish brown; legs light brown, with darker hairs. Fore wing: broadest beyond middle of wing; Rs arising close to the base; M dividing into M1+2 and M3+4 below the division of Rs; R4+5 separating before R2+3; Cu2 and anal veins apparently absent, although there is a short vein leading from the hind margin and terminating on Cu1 near its distal end; this is probably a remnant of an anal vein which was originally more or less marginal. Hind wing: cross-vein between R1 and R2+3 missing. All four branches of Rs present; M with two branches; Cu1 forked. Genitalia as in figure 2.

Female unknown.

Holotype (♂), Bryson City, Deep Creek, 2000 ft., North Carolina, Aug. 26, 1932, N. Banks, collector; in Museum of Comparative Zoology.

Paratype: 1 ♂, same locality and date as holotype; in Museum of Comparative Zoology.

So far as the tibial spurs are concerned, this species belongs to the subfamily Goerinæ; but it is separated from all other genera of that group by the possession of the vein between R1 and R2 below the pterostigma. In fact, the only other North American genus of the Sericostomatidæ in which this vein is present is Agarodes, which has only two spurs on the middle tibiæ and which is therefore a member of the Sericostomatinæ.

Neuropsyche, new genus (*Lepidostominæ*)

♂ Spurs, 1, 4, 4; ocelli absent; maxillary palpi short, slightly flattened, covered with long gray hairs and scales, basal segment of antennæ thickened, but not so long on the head. Fore wing: Rs arising close to the base, with three branches (R2, R3, R4+5); M with two branches; Cu1 unbranched.

♀ Spurs 1, 4, 4; basal segment of antennæ longer than that of male and less thickened; venation similar to that of male, except that R4+5 is forked in both fore and hind wings.

Genotype: *Neuropsyche tibialis*, n. sp.

Neuropsyche tibialis, n. sp.

Figures 3, 15, 16.

♂ Length of fore wing, 6-7 mm; vertex and frons light yellow; antennæ light yellow; the basal segment covered with light yellow hairs; maxillary palpi yellow, the ventral surface covered with long, brown hairs, and the dorsal surface, with whitish scales; labial palpi short, gray; thorax, legs, and abdomen light yellow. Fore wing: rather slender, nearly oval; R4+5 arising before the middle of wing; M dividing just beyond mid-wing. Hind wing: Rs branched as in fore wing; M with two branches, arising before origin of R4+5; Cu1 unbranched. The wings are covered with flattened yellow hairs.

♀ Color and size as in male.

Holotype (♂) and allotype: Bryson City, Deep Creek, North Carolina, Aug. 27, 1930; P. J. Darlington, collector.

Paratypes: 1 ♂ Bryson City, North Carolina, Aug. 23; 7 ♂ ♂, Bryson City, Aug. 26; 3 ♂ ♂, Bryson City, Aug. 27; 2 ♀ ♀, Bryson City, Aug. 23; 3 ♀ ♀, Bryson City, Aug. 26; 1 ♀, Nantahala Gorge, North Carolina, Aug. 25, 1930. All types in Museum of Comparative Zoology.

Neuropsyche is readily distinguished from the other North American genera of Sericostomatidæ by the possession of one tibial spur on the front legs, and four on the middle ones. This condition is not present in any other genera of our fauna, except the very aberrant Nosopus. I have placed the genus tentatively in the Lepidostominæ, but its position is not at all certain.

Micrasema falcata Banks

Nine specimens were taken at Deep Creek, Bryson City, Smoky Mts., Aug. 26 and 27; Smokemont, Smoky Mts., N. Carolina, Aug. 24; and Andrews, N. Carolina, Aug. 23.

RHYACOPHILIDÆ

Rhyacophila fuscula Walker

Figure 5.

Ten specimens of this species were collected at the following localities: Newfound Gap, Smoky Mts., 5000-5200 ft., Tennessee, Sept. 1; Smokemont, N. Carolina, Aug. 24; Bryson City, N. Carolina, Aug. 23-27; Nantahala Gorge, 2000 ft., N. Carolina, Aug. 25. This is the first record of the species south of New Jersey known to me.

Rhyacophila torva Hagen

Figure 7.

Rhyacophila torva Hagen, 1861, Syn. Neur. N. A., 296.
Rhyacophila terminata Banks, Proc. Ent. Soc. Wash., 8: 132; fig. 7.

Over forty specimens of this species were collected at Nantahala Gorge, Bryson City and Smokemont, N. Carolina; and other specimens were taken between Blowing Rock and Linville, N. Carolina; Willets, N. Carolina; Andrews, N. Carolina; and Newfound Gap, Smoky Mts., Tennessee. This is perhaps the commonest of our eastern species of Rhyacophila. As I have indicated above, Banks' *terminata* is synonymous with *torva;* the types of both of these species, now in the Museum of Comparative Zoology, are identical. Betten has suggested[2] that the species which Banks identified and figured as torva is the same as *nigrita* Banks; but I am not sure that this is so, since I cannot locate the specimen on which Banks based his figure. For purposes of comparison I have included here a drawing of the genitalia of *nigrita,* which was originally described from the Black Mountains, N. Carolina (figure 11.)

---

[2] List of the Insects of New York, p. 522, 1926.

Rhyacophila glaberrima Ulmer

Ulmer, 1907, Coll. Selys, 6, Trichoptera: 85; fig. 131, 132.

This species has previously been known only by the male type, collected many years ago in Georgia[3]. I therefore take this opportunity to describe the female, several specimens of which were collected in 1930:

♀ Color of body similar to that of ♂, the head except frons dark brown; frons yellowish; hairs on vertex, at least those between the ocelli, yellowish brown; the warts between the ocelli are very prominent and elongate-oval in shape; the posterior warts are also long and oval. The female herewith designated as allotype was collected by the writer between Blowing Rock and Linville, N. Carolina, at an altitude of 3-4000 feet, September 8, 1930.

Forty additional specimens, of both sexes, were collected at the following localities: Bryson City, N. Carolina, Aug. 26-27; Nantahala Gorge, Aug. 25; Andrews, Aug. 25; Mt. Mitchell, about 4000 ft., Sept. 4; Little Switzerland, Black Mountains, N. Carolina, Sept.; and Newfound Gap, Smoky Mt., 5000-5200 ft., Tenn., Sept. 1-3. The insects resemble *torva* superficially, but the males are easily separated by the genital structure, as can be seen by comparing Ulmer's figure of *glaberrima* with that of *torva* given here (figure 7). The females can be distinguished by the hairs on the vertex, which are a very dark brown in *torva* but light brown or even yellow in *glaberrima;* and by the interocellar and posterior warts, which are rounded and flattened in *torva,* but oval and prominent in *glaberrima.*

Rhyacophila carolina Banks

Two males found at Bryson City, N. Carolina, Aug. 26, and another on the road between Blowing Rock and Linville, N. Carolina, Sept. 8.

---

[3] In the Genera Insectorum (1907) Ulmer erroneously gives the type locality as Massachusetts.

Rhyacophila montana, n. sp.

Figure 10.

Male: Length of fore wing, 5 mm. Body uniformly dark brown, nearly black; ocelli white; wings uniformly smoky brown, probably with golden spots in fresh specimens. Fore wing: R2+3 and R4+5 forked to the same depth; M dividing just basal of the origin of Rs; forks of M shallow, fork M1+2 not so deep as fork M3+4; Cu forked directly below origin of Rs. Hind wing: fork M3+4 deeper than fork R2+3; M3+4 not forked; M dividing first directly below origin of Rs. Genitalia as in figure 10.

Female: Length of fore wing, 7 mm.; similar to the male in coloration and venation. The wings have more hair than those of any of the males, and show several golden spots.

Holotype (♂), Newfound Gap, Smoky Mts., 5000-5200 ft., Tennessee, Aug. 30, 1930; N. Banks, collector. Allotype: same locality, Sept. 3; F. Carpenter, collector.

Paratypes: 3 males, same data as holotype, N. Banks, collector; 1 male, same locality, Aug. 31, F. Carpenter; 1 male, Bryson City, Deep Creek, 2000 ft., Aug. 23, N. Banks.

Paragapetus moestus Banks

Three males were taken at Deep Creek, Bryson City, North Carolina, Aug. 23, and two males at Newfound Gap, Smoky Mountains, Tennessee, Aug. 30. The types of the species were collected at Black Mt., North Carolina.

Glossosoma nigrior Banks

Previously known only by the type specimens from Black Mountains, N. Carolina, this species was well represented in the 1930 collection by thirteen males and females, taken at Deep Creek, Bryson City, N. Carolina, Aug. 26, 28; and Nantahala Gorge, N. Carolina, Aug. 25.

Chimarrha aterrima Hagen

One male was collected at Andrews, N. Carolina, 1800 ft., Aug. 25, and another at Nantahala Gorge, N. Carolina, 2000 ft., Aug. 27.

HYDROPSYCHIDÆ

Hydropsyche alternans Walker

Figure 1.

Seven specimens of this common eastern species were taken at Bryson City, N. Carolina, and also at Smokemont, Andrews, and Willets, Aug. 24 and 25.

Hydropsychodes minuscula Banks

Although originally described from Plummer's Island, Maryland, this species was represented by thirteen species from Nantahala Gorge, Andrews, Ashland in N. Carolina, Aug. 22-25; and near the French Broad River, Tennessee, 6 miles west of the N. Carolina line, Aug. 28.

POLYCENTROPIDÆ

Phylocentropus carolinus, n. sp.

Figure 9.

♂ Length of fore wing, 6 mm.; vertex and frons gray-brown; antennæ yellow, except the basal segment, which is brown; thorax covered with bray-brown hairs; legs yellow; wings spotted with brown and yellow. Fore wing: Rs arising near the middle of the wing; forks $R2^+3$ and $R4^+5$ are the same depth; fork $M3^+4$ deeper than $M2^+3$; M dividing before the origin of Rs; Cu1 forked below Rs. Genitalia as in figure 9. Female unknown.

Holotype (♂): Nantahala Gorge, 2000 ft., N. Carolina, Aug. 25; N. Banks, collector. Paratypes: two males, Bryson City, Deep Creek, N. Carolina, Aug. 26; N. Banks, collector; one male, Bryson City, Aug. 25, F. Carpenter, collector; four males, Nantahala Gorge, N. Carolina, Aug. 25, N. Banks, collector.

This species is the fourth to be described in the genus; it is closest to *lucidus* Hagen, but the genital appendages are much larger in *carolinus* than in Hagen's species.

Neuroclipsis parvula Banks

This species, originally described from Maryland, has subsequently been found in northern New York. Two specimens were collected in 1930: one male at Andrews, N. Carolina, Aug. 23; and one near the French Broad River, Tennessee, 6 miles west of the N. Carolina state line, Aug. 28.

PSYCHOMIIDÆ

Psychomyia flavida Hagen

Figure 6.

This species has been taken commonly from the District of Columbia to eastern Canada, but not previously in the southern states; two specimens were collected in Nantahala Gorge, N. Carolina, Aug. 25.

PHILOPTAMIDÆ

Philopotamus distinctus Walker

Fifteen specimens were taken in the Smoky Mt. and Black Mt. region: Bryson City, Andrews, Linville, Marshall and Black Mt., all N. Carolina; and Newfound Gap, Smoky Mts., Tennessee, during late August and early September.

LEPTOCERIDÆ

Mystacides nigra Linn.

One male was taken at Andrews, N. Carolina, Aug. 25, at an altitude of about 1800. This conspicuous insect has been recorded from most of the northern states and Canada, but I have not seen any specimens previously collected south of the District of Columbia and vicinity. It is interesting that no specimens were secured in the Black Mts. or Smoky

Mts. proper, where one would expect to find such a northern species.

Plate I.

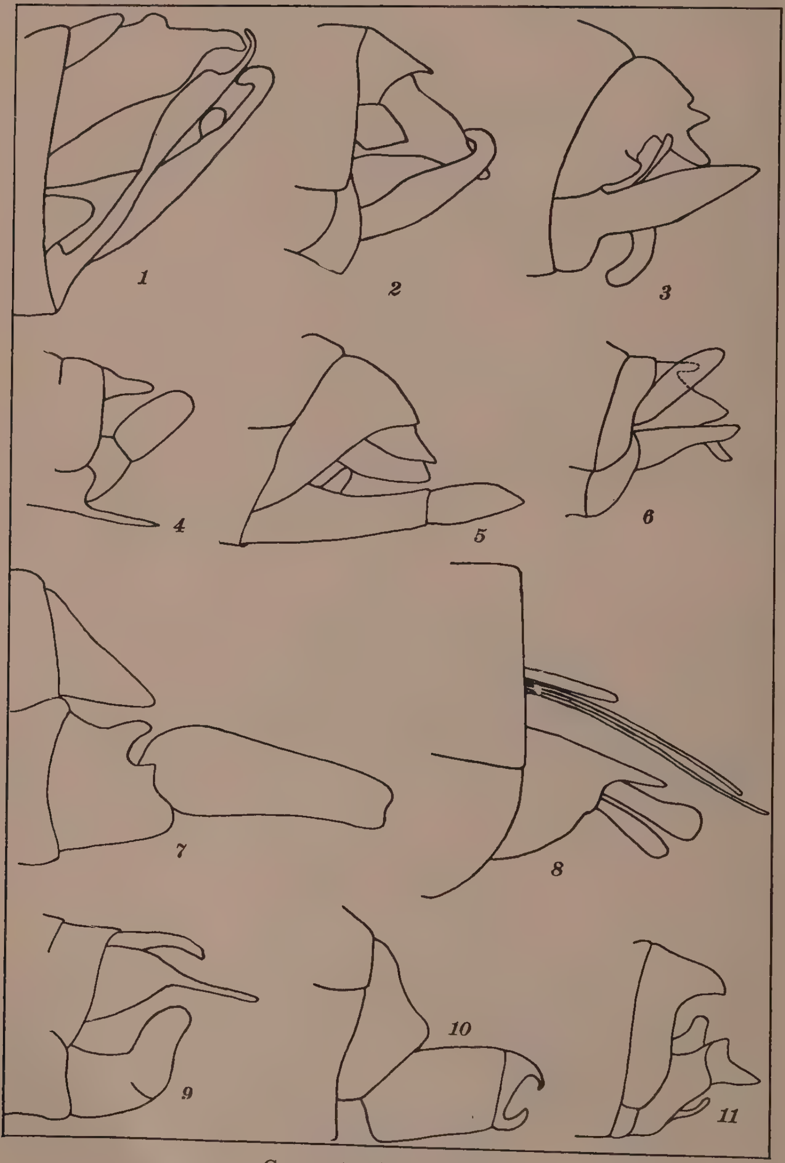
Male genitalia, lateral views.

Figure 1. *Hydropsyche alternans* Walker
Figure 2. *Pseudogoera singularis,* n. sp.
Figure 3. *Neuropsyche tibialis,* n. sp.
Figure 4. *Paragapetus moestus* Banks
Figure 5. *Rhyacophila fuscula* Walker
Figure 6. *Psychomyia flavida* Hagen
Figure 7. *Rhyacophila torva* Hagen
Figure 8. *Goera calcarata* Banks
Figure 9. *Phylocentropus carolinus,* n. sp.
Figure 10. *Rhyacophila montana,* n. sp.
Figure 11. *Rhyacophila nigrita* Banks

Plate II.

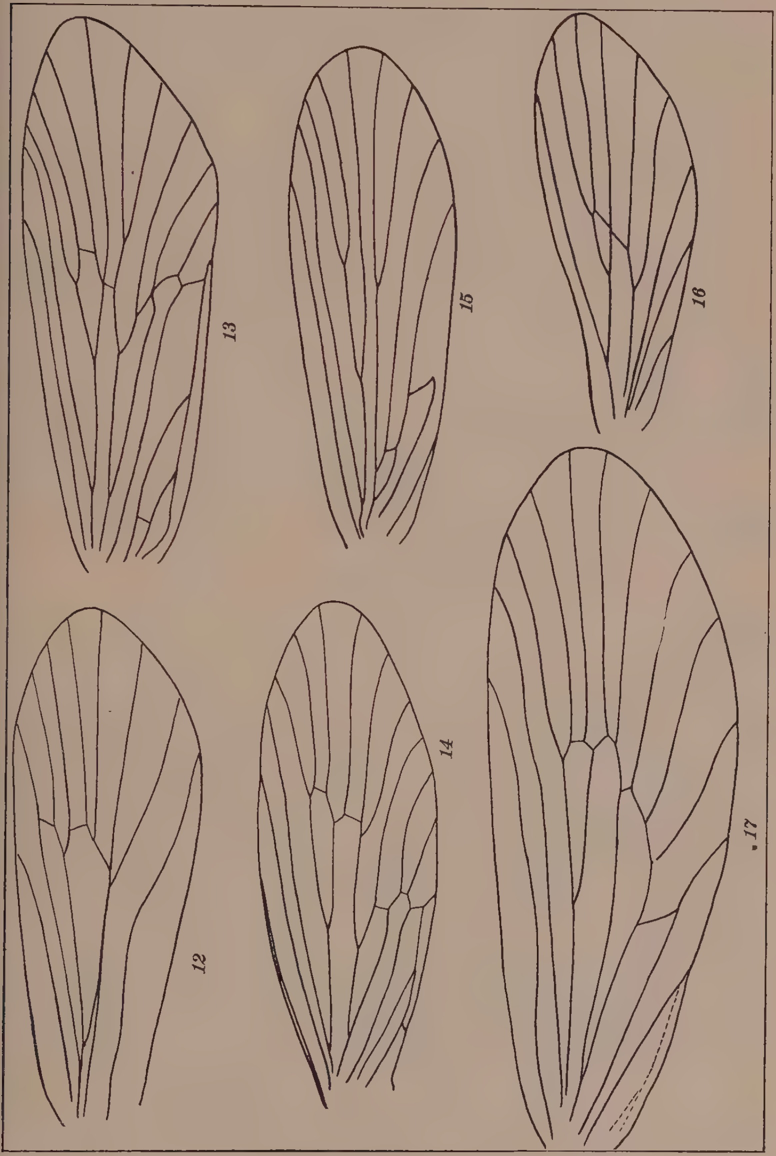
Figure 12. *Pseudogoera singularis,* n. sp., fore wing.
Figure 13. *Goera calcarata* Banks, fore wing.
Figure 14. *Notiopsyche latipennis* Banks, fore wing.
Figure 15. *Neuropsyche tibialis,* n. sp., fore wing.
Figure 16. *Neuropsyche tibialis,* n. sp., hind wing.
Figure 17. *Phanopsyche grisea* Banks, fore wing.

Psyche, 1933 Vol. 40, Plate 1



Carpenter-Trichoptera

Psyche, 1933 Vol. 40, Plate 2



Carpenter-Trichoptera

NOTES ON AMERICAN TRYPETIDÆ *(Diptera)* II.

By Marston Bates,

Museum of Comparative Zoology, Cambridge, Mass.

The species considered in this paper all belong to groups which have the "*Aciura*" wing pattern—black, with hyaline indentations. The various genera have little else in common, and belong to widely separated sections of the family, although they are sometimes placed together. The group of species placed in *Aciurina* by Curran (1932, p. 9) will be considered in a separate paper. I am indebted to Mr. E. T. Cresson, Jr., of the Philadelphia Academy of Sciences, and to Mr. C. H. Curran, of the American Museum of Natural History, for part of the material on which this work is based.

Genus BLEPHARONEURA Loew

Loew, 1873, p. 272 (type, *B. poecilogastra* Loew, sole species)

The front is about as broad as one eye, less than twice as high as broad. There are two pairs of upper, and two of lower orbital bristles; the verticals and ocellars are well developed. The third antennal segment is about as long as the second, rounded. The face is excavated, with the oral margin projecting. The dorsocentrals are behind the anterior supra-alars; there are three pairs of scutellars. The venation is shown in Fig. 2; the third and fifth veins are spinose above.

The above notes are based on the genotype, with which the following new species agrees closely in structure, despite the very different wing pattern.

Blepharoneura hirsuta, sp. nov.

Figs. 1, 2.

♀ The head is brown, lighter just above the antennæ, with the ocellar triangle black; the bristles are all dark brown. The thorax above is brown, shiny, covered with fine hairs, which appear yellowish or dark, depending on the light. The thoracic bristles are dark brown. The sides of the thorax and the legs are lighter, yellowish, the legs covered with yellow spines and hairs. The scutellum is yellow. The abdomen is marked above by two broad black subdorsal longitudinal bands, in sharp contrast to the yellow medio-dorsal area and under-surface. The ovipositor sheath is broad, flat, trapezoidal in outline, black; it is covered with fine hairs.

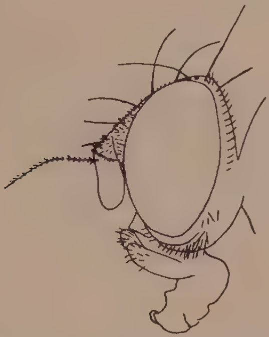


Fig. 1. *Blepharoneura hirsuta,* sp. nov., profile of head.

The wing is dark brown, lighter in the costal cell and toward the posterior margin, with the following hyaline indentations: a triangular area in the marginal cell at the tip of the first longitudinal vein, which reaches the third vein below; an elongate band which opens on the lower half of the first posterior cell, and extends above to the second vein; two similar bands opening in the second posterior cell, the first of which reaches the third vein above, while the second stops at the fourth; two other bands in the third posterior cell, the outer of which extends across the discal cell above to the fourth vein, the inner reaching beyond to the third vein. There is a small hyaline spot in the second basal cell, and another in the anal cell.

Total length, 6.1 mm.; length of wing, 6.3 mm.; length of ovipositor sheath, 0.8 mm.

Type, one female, from Aroa, Venezuela, in the American Museum of Natural History.

Genus HEXACHAETA Loew

Loew, 1873, p. 219 (type, *Trypeta eximia* Wied., by desig. of Coquillett, 1910)

The front is narrow, about half as wide as one eye; there are three lower and two upper pairs of orbitals; the ocellars are rather weak, the verticals well developed. The third antennal segment is moderate to long, rounded; the face is slightly excavated beneath the antennae. The dorsocentrals are behind the anterior supra-alars; there are pairs of scutellars. The third vein is spinose for most of its length; the fifth vein is spinose at the base in the genotype.

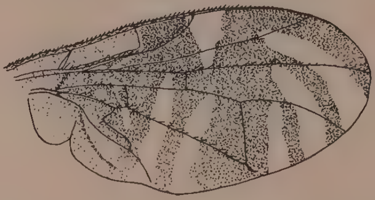


Fig. 2. *Blepharoneura hirsuta,* sp. nov.

Some of the species assigned to this genus have a rather "*Aciura*-like" wing pattern. The group is very likely heterogeneous as at present listed.

Genus EULEIA Walker

Euleia Walker, 1836, p. 81 (type *Musca caesio* Harris, as *onopordinis,* sole sp.)

Myoleja Rondani, 1856, p. 112 (type *Tephritis lucida* Fall.)

Philophylla Rondani, 1870, p. 9 (type *Musca caesio* Harris)

Eucosmoptera Phillips, 1923, p. 131 (in part; no type designated.)

Myiolia Hendel, 1927, p. 100.

Aciura and *Acidia* auctorum, in part.

The front is narrow, one and one half to two times as high as wide, sparsely hairy. There are three pairs of lower orbital bristles, two of upper; the ocellars are moderately developed or weak; the occipitals are black, fine. The third antennal joint is moderate to long, rounded; the face is almost flat, the lower edge projecting only slightly if at all. The dorsocentrals are behind the anterior supra-alars; there are two pairs of scutellars. The third vein is spinose above on the lower half at least.

I can find no basis for the oft repeated statement that *Euleia* Walker is preoccupied, except that Hübner had previously used the variant spelling *Eulia* in the Lepidoptera.

Euleia limata (Coquillett)

Aciura limata Coquillett, 1899, p. 263.

This species, from the Eastern United States, seems to be strictly congeneric with the European *cæsio*. It is a Ceratitine form, in no way related to either *Aciura* or *Xanthaciura*.

Euleia nigricornis (Doane)

Aciura nigricornis Doane, 1899, p. 183, pl. III, f. 7.

Despite the peculiar sex characters of the male, this species seems to fit here better than anywhere else.

Genus POLYMORPHOMYIA Snow

Snow, 1894, p. 165. (type, *P. basilica* Snow, sole species).

The front is higher than wide, hairy. There are three lower orbitals, one upper orbital; the ocellars are well developed. The third antennal joint is long; the face is retreating; the occipitals are white and stumpy. The dorsocentrals are in front of the anterior supra-alars; there are two pairs of scutellars. The third vein is spinose; the wings broad.

Two species have been described in this genus.

Genus PSEUDEUTRETA Hendel

Hendel, 1914, p. 86. (type, *Trypeta adspersa* Wiedemann)

The front is higher than wide, hairy. There are three lower orbitals, one upper orbital; the ocellars are well developed. The third antennal joint is short; the face projects slightly; the occipitals are white, stumpy. The dorsocentrals are in front of the anterior supra-alars; there is one pair of scutellars. The third vein is naked above; the wings are broad.

The above notes are based on the following new species; the only other species that I have seen is *P. anteapicalis* Hendel, in the National Museum collection. Six South American species have previously been placed in the genus.

Pseudeutreta ligularis, sp. nov.

Fig. 3.

♂ ♀ The front is a little broader than one eye, slightly higher than broad, brown, with a few scattered white, stumpy, hairs. The thorax is dark reddish brown, almost black, finely pollinose, with a few scattered stumpy white hairs on the dorsum, lacking on the sides. The scutellum is concolorous with the thorax. The head and thoracic bristles are all black. The abdomen is black, thickly covered with fine hairs. The genitalia of the male are lighter, brown, as is the ovipositor sheath of the female which, however, is narrowly tipped with black. The legs of the female are a rather uniform light brown except the somewhat darker posterior tibia; in the male, however, the fore femur is darker also, and somewhat swollen.

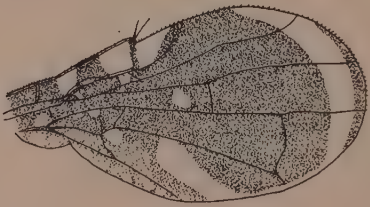


Fig. 3. *Pseudeutreta ligularis,* sp. nov.

The wing pattern is shown in figure 3. There are two hyaline indentations in the costal cell, both of which have narrow extensions across the first longitudinal vein. A similar indentation in the stigmal cell is yellowish rather than hyaline. A hyaline band borders the wing tip from about the middle of the marginal cell to the fifth vein, separated from the distal margin of the wing by a narrow brown area which begins just beyond the second vein, and extends to about a third of the distance between the fourth and fifth veins. A hyaline indentation in the third posterior cell opens on the lower half of the cell margin, and extends about two thirds of the way up the cell to end on the fifth vein. There is a round hyaline spot in the first basal cell, just before the small cross-vein, another in the very base of the third posterior cell, and some rather indefinite clear spots along the posterior margin of the wing.

Total length of female, 5.5 mm.; length of wing, 5.0 mm.; length of ovipositor sheath, 0.6 mm.

Described from one male (the holotype), and one female (allotype), in the Museum of Comparative Zoology, from Sara Prov., Bolivia (Steinbach); one male paratype from São Paulo, Brazil.

This species seems close to *Aciura falcigera* of Kieffer, described from Argentina. It differs from Kieffer's description and figure in several ways, most notably in the wing pattern. The apical narrow hyaline spot of *falcigera* is lacking in *ligularis;* the sickle-shaped hyaline band which parallels the wing tip does not reach the costa above in *falcigera,* and so forth.

Genus TETREUARESTA Hendel

Hendel, 1928, p. 368 (type, *Trypeta obscuriventris* Loew)

This genus is included here because of the wing pattern of the following new species; the described species of the group all have a typical "Euaresta" pattern. The genus is sufficiently well characterized by Hendel, *l.c.*

Tetreuaresta bartica, sp. nov.

Fig. 4.

♂ ♀ The front is yellowish, slightly elevated on its lower half, strongly narrowed toward the base, about two-thirds as wide at the vertex as high. There are three pairs of brown lower orbitals, two of upper orbitals; the vertical and ocellar bristles are well developed. The antennae do not quite reach the oral margin; the third joint is about twice as long as the second; the cheeks, face and mouthparts are proportioned much as in *T. obscuriventris.*

The thorax is probably black, overlaid with greyish pollen in all of my specimens. The bristles are well developed, yellow, arranged much as in the genotype, *T. obscuriventris.* The scutellum is yellowish, with both pairs of bristles well developed; the legs are yellow, with light colored hairs and spines.

The wing pattern is shown in figure 4. The ground color is a uniform dark brown, with various hyaline indentations and spots. The costal cell is mostly hyaline, with some brown lines; the stigmal cell includes a yellowish spot which occupies about half of its area. There are two triangular hyaline indentations in the marginal cell, the tips of which extend over the second longitudinal vein, almost reaching the third vein. A small hyaline spot is sometimes present just below the tip of the second vein. The spots in the first hind marginal cell are variable in number and position, and may be different on the two wings of one specimen. Most commonly three are present, sometimes only the two basal spots are present; sometimes the apical spot splits into two, as in the figure, or even three smaller spots. The first basal cell includes a single round hyaline spot. In the second hind marginal cell there are three hyaline indentations: the distal one is small, round, and may be absent; the two proximal ones are elongate, always present. The third hind marginal cell includes two elongate hyaline areas which reach the fifth vein above; there is a small round spot in the discal cell, usually about midway between these two marginal in-

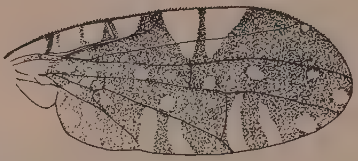


Fig. 4. *Tetreuaresta bartica,* sp. nov.

dentations. There are various hyaline spots on the base of the wing. The cross-veins are approximated, parallel; the third vein is spinose for almost its entire length.

The abdomen is brown, sparsely covered with brownish hairs. The ovipositor sheath of the female is dark brown, trapezoidal in shape.

Total length, female, 4 mm.; length of wing, 3.4 mm.; length of ovipositor sheath, 0.6 mm.

Described from 10 ♂ ♂ and 7 ♀ ♀ from Bartica, British Guiana, March, April, May and September, from the Johnson Collection in the Museum of Comparative Zoology, and the collection of the Academy of Natural Sciences of Philadelphia. The types are distributed as follows: holotype ♂, and allotype ♀, and 5 paratypes in the M.C.Z.; 5 paratypes in the A.N.S.P.; 2 paratypes in the United States National Museum; 2 paratypes in the American Museum of Natural History; one paratype in the collection of H. K. Munro.

This very interesting species agrees closely in structure with *Tetreuaresta obscuriventris,* except that it has two well developed upper orbitals, while only one pair is present in Loew's species. The wing pattern is very like that of *Xanthaciura,* and there are some structural similarities.

Genus XANTHACIURA Hendel

Hendel, 1914, p. 86. (type, *Trypeta chrysura* Thomson).

Tetraciura Hendel, 1914, p. 90. (type, *T. quadrisetosa* Hendel).

Eucosmoptera Phillips, 1923, p. 131 (in part; no type designated).

The front is very narrow, naked; there are three pairs of lower orbital bristles, but only one fully developed pair of upper orbitals; the ocellars are well developed. The face is retreating; the occipitals are white, stumpy. The dorsocentrals are in front of the anterior supra-alars; there may be one or two pairs of scutellars. The wings are narrow, the third vein naked.

Eucosmoptera tetraspina Phillips may be taken as the type of her genus, as it was the species with which she was most familiar. There really seems to be no good reason for separating the species with two scutellars from those with four, in this case, as the species are all very close, and form a compact, well defined group when arranged together.

BIBLIOGRAPHY

Coquillett, D. W. 1899. Notes and descriptions of Trypetidæ. Journ. N. Y. Ent. Soc., VII, pp. 259-268.

Curran, C. H. 1932. New species of Trypaneidæ, with key to the North American genera. Am. Mus. Nov., No. 556, 19 pp., 9 figs.

Doane, R. W. 1899. Notes on Trypetidæ with descriptions of new species. Journ. N. Y. Ent. Soc., VII, pp. 177-193, pl. 3, 4.

Hendel, F. 1914. Die Gattungen der Bohrfliegen. Wiener Ent. Zeit., XXXIII, pp. 73-98.

— 1927. Trypetidæ, in Lindner, Die Fliegen der palæarktischen Region, 49. 221 pp., 17 pl., 79 textfigs.

— 1928. Neue oder weniger bekannte Bohrfliegen meist aus dem Deutschen entomologischen Institut Berlin-Dahlen.
Ent. Mitteilungen, XVII, pp. 341-370.

Loew, H. 1873. Monographs of the Diptera of North America, pt. III. Smiths. Misc. Coll., 256. 351 pp., 4 pl.

Phillips, V. T. 1923. A revision of the Trypetidæ of Northeastern America. Journ. N. Y. Ent. Soc., XXXI, pp. 119-155, pl. 18, 19.

Rondani, C. 1856. Dipterologiæ italicæ prodromus. I. Parma, 228 pp.

— 1870. Ortalidinæ italicæ, collectæ, distinctæ et in ordinem dispositæ. VII, fasc. 4, Tephritoidi. Bull. Soc. Ent. Ital., II, pp. 4-31; 105-133.

Snow, W. A. 1894. Descriptions of North American Trypetidæ, with notes. Paper I. Kans. Univ. Quart., II, pp. 159-174, pl. 6, 7.

Walker, F. 1836. Descriptions of the British Tephritites. Entomological Mag., III, pp. 57-85.

PIN-LABELS IN MULTIPLES OF 1000, ALIKE

One Dollar Per Thousand

Smallest Type. Pure White Ledger Paper. Not over 4 Lines nor 30 Characters (13 to a line) Additional Characters, 3 cents each, in total and per line, per 1000. Trimmed so one cut makes a label.

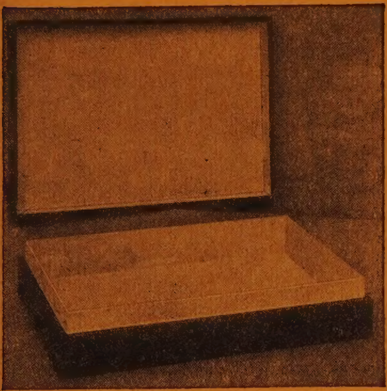
C. V. BLACKBURN, 7 Emerson St., STONEHAM 80, MASS

CAMBRIDGE ENTOMOLOGICAL CLUB

A regular meeting of the Club is held on the second Tuesday of each month (July, August and September excepted) at 7.45 p. m. in Room C-455, Biological Institute of Harvard University, Divinity Ave., Cambridge. Entomologists visiting Boston are cordially invited to attend.

WARD'S NATURAL SCIENCE ESTABLISHMENT, Incorporated,

P. O. Box 24, Beechwood Station, Rochester, N. Y.



We can now offer:

The Hood Insect Box, designed by Prof. J. Douglas Hood of the University of Rochester. This is a strong, tight box, measuring 12-3/4 x 8-3/4 x 2-3/4 inches, moderately priced, only $12.00 per dozen; single boxes, $1.25 each.

The Hood Insect Net, strongly constructed and dependable, with no soldered joints. The price of this, complete with Bruxelles bag and handle, is $1.60.

We also make the *only genuine Schmitt insect box* and the *American Entomological Co. insect pins.*

Write for catalogue No. 43 of Entomological Supplies.

**THE FRANK A. WARD FOUNDATION
OF NATURAL SCIENCE
of the University of Rochester**

COMPLETE SET OF PSYCHE

Volumes 1-38 (Bound) For Sale

Please communicate with Miss Parthenia J. Ford, 60 Gorham Avenue, Brookline, Mass. This is the set belonging to the late Mr. C. W. Johnson.

BACK VOLUMES OF PSYCHE

The Cambridge Entomological Club is able to offer for sale the following volumes of Psyche. Those not mentioned are entirely out of print.

Volumes 2, 3, 4, 5, 6, 7, 8, 9, 10; each covering a period of three years, $5.00 each.

Volumes 12, 14, 15, 17, each covering a single year, $1.00 each.

Volumes 18, 19, 20, 21, 22, 23, 24, 25, 26, each covering a single year, $1.50 each.

Volumes 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, each covering a single year, $2.00.

Orders for 2 or more volumes are subject to a discount of 10%.

Orders for 10 or more volumes subject to a discount of 20%.

A set of all the volumes available (35 in all) will be sold for $69.00.

All orders should be addressed to

F. M. CARPENTER, Associate Editor of Psyche,
Museum of Comparative Zoölogy,
Department of Entomology,
Cambridge, Mass.